

Svenska Elektriska Kommissionen, SEK

Fastställt	Utgåva	Sida	Ingår i
2003-02-28	1	1 (1+29)	SEK Område 215

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

Fastighetsnät för informationsöverföring – Generella kabelnät – Provning av installerade kabelnät

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

Som svensk standard gäller europastandarden EN 50346:2002. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50346:2002.

ICS 35.110

Denna standard är fastställd av Svenska Elektriska Kommissionen, SEK, 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@sekom.se. Internet: www.sekom.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

Svenska Elektriska Kommissionen, SEK, 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

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

EUROPEAN STANDARD

EN 50346

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2002

ICS 35.110

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

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*.

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:

- 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) 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.

Contents

Introduction.....	5
1 Scope.....	5
2 Normative references.....	6
3 Definitions, abbreviations and symbols	7
3.1 Definitions	7
3.2 Abbreviations	8
3.3 Symbols	9
4 General requirements	9
4.1 Location of measurement (test) interfaces	9
4.2 Safety requirements for test procedures	11
4.3 Test system	11
4.4 Normalisation and calibration	13
4.5 Environmental conditions	13
4.6 Test results	13
4.7 Documentation	14
5 Test parameters for balanced copper cabling	15
5.1 Wire map	15
5.2 Length.....	15
5.3 Propagation delay.....	15
5.4 Delay skew	15
5.5 Attenuation (insertion loss).....	15
5.6 Attenuation (insertion loss) deviation	16
5.7 Near end crosstalk loss (NEXT, pair-to-pair and power sum).....	16
5.8 Equal level far end crosstalk loss (ELFEXT, pair-to-pair and power sum).....	16
5.9 Attenuation to crosstalk ratio (ACR, pair-to-pair and power sum).....	17
5.10 Return loss	17
5.11 Unbalance attenuation, near end (LCL)	18
5.12 Coupling attenuation.....	18
5.13 Direct current (d.c.) loop resistance	18
5.14 Resistance unbalance	18

6	Test parameters for optical fibre cabling	19
6.1	Propagation delay.....	19
6.2	Length.....	20
6.3	Inter-component distance.....	20
6.4	Attenuation.....	21
6.5	Return loss.....	22

Annex A (normative)	Test procedures for multimode optical fibre cabling attenuation measurement	24
----------------------------	--	-----------

Bibliography	29
---------------------------	-----------

Figures

Figure 1 - Example of a cabling channel.....	9
Figure 2 - Example of a cabling link.....	9
Figure 3 - Reference planes for link and channels (point-to-point).....	10
Figure 4 - Reference planes for link and channels (bus configuration).....	11
Figure 5 - The test system and the cabling under test.....	12
Figure A.1 - Reference power measurement for method 1.....	25
Figure A.2 - Reference power measurement for method 2.....	26
Figure A.3 - Cable plant measurement for methods 1 and 2.....	26

Tables

Table 1 - Attenuation test methods.....	22
Table A.1- Light source characteristics.....	24
Table A.2 - Light source categorization by CPR value (850 nm wavelength).....	28
Table A.3 - Light source categorization by CPR value (1 300 nm wavelength).....	28

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 50173-1 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.

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).

EN 50289-1-6, *Communication cables - Specifications for test methods – Part 1-6: Electrical test methods – Electromagnetic performance*

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

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 61300-3-4, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-4: Examinations and measurements – Attenuation (IEC 61300-3-4:2001)*

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 61935-1:2000, *Generic cabling systems – Specification for the testing of balanced communication cabling in accordance with EN 50173 - Part 1: Installed cabling (IEC 61935-1:2000)*

EN 61935-1:2000/A1:2002, *Generic cabling systems – Specification for the testing of balanced communication cabling in accordance with EN 50173 – Part 1: Installed cabling (IEC 61935-1:2000/A1:2002)*