

EUROPEAN STANDARD

EN 60950

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2000

ICS 35.020; 35.260.10

Supersedes EN 60950:1992 + A1:1993 + A2:1993 + A3:1995 + A4:1997 + A11:1997

English version

Safety of information technology equipment
(IEC 60950:1999 + corr. February 2000, modified)

Sécurité des matériels de traitement de
l'information
(CEI 60950:1999 + corr. février 2000,
modifiée)

Sicherheit von Einrichtungen der
Informationstechnik
(IEC 60950:1999 + corr. February 2000,
modifiziert)

This European Standard was approved by CENELEC on 2000-01-01. 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

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Foreword

The text of document 74/498/FDIS, future 3rd edition of IEC 60950:1999, prepared by IEC TC 74, Safety and energy efficiency of IT equipment, was submitted to the IEC-CENELEC parallel vote.

In March 1999 a new draft including common modifications, special national conditions and A-deviations from EN 60950:1992, prepared by the Technical Committee CENELEC TC 74, was submitted to the formal vote together with four draft common modification amendments prAA, prAB, prAC and prAD.

In view of the comments received on the draft amendments, the CENELEC Technical Board decided to organize a BT enquiry on a revised draft European Standard including those parts of the amendment documents which had received support to become special national conditions.

This revised draft was ratified by CENELEC as EN 60950 on 2000-01-01.

This European Standard replaces EN 60950:1992 and its amendments A1, A2, A3, A4, and A11.

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)	2001-01-01
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latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-01-01
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Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given for information only. In this standard, annexes A, B, C, D, E, F, G, H, J, K, L, M, N, P, U, V, ZA and ZB are normative; annexes Q, R, S, T, W, X and ZC are informative. Annexes ZA, ZB and ZC have been added by CENELEC.

Endorsement notice

The text of International Standard IEC 60950:1999 was approved by CENELEC as a European Standard, with agreed common modifications as given below:

COMMON MODIFICATIONS

Delete all the "country" notes that appear on the following pages of the reference document (IEC 60950:1999):

85, 91, 99, 103, 117, 119, 123, 125, 149, 171, 213, 215, 219, 251, 283, 325, 327, 331, 333 and 407.

Replace the subclause as follows:

Basic requirements

To protect against excessive current, short circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b), and c) :

a) Except as detailed in b) and c), protective devices necessary to comply with the requirements of subclause 5.3 shall be included as parts of the equipment.

b) For components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short circuit and earth fault protection may be provided by protective devices in the building installation.

c) It is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instruction.

If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.

This subclause has been declared 'void'.

3.2.3 **Delete** NOTE 1, and in table 3A **delete** the conduit sizes in parentheses.

Replace "60245 IEC 53" by "H05 RR-F"
"60227 IEC 52" by "H03 VV-F or H03 VVH2-F"
"60227 IEC 53" by "H05 VV-F or H05 VVH2-F2"

In table 3B, **replace** the first four lines by the following:

Up to and including 6		0,75 ¹⁾
Over 6 up to and including 10	(0,75) ²⁾	1,0
Over 10 up to and including 16	(1,0) ³⁾	1,5

In the Conditions applicable to table 3B **delete** the words "in some countries" in condition ¹⁾.

In NOTE 1, **delete** the second sentence.

3.3.4 In table 3D, **delete** the fourth line - conductor sizes for 10 to 13 A, and **replace** with the following:

"| Over 10 up to and including 16 | 1,5 to 2,5 | 1,5 to 4 |"

Delete the fifth line - conductor sizes for 13 to 16 A.

4.3.13 **Replace** the second compliance paragraph by:

For equipment using LEDs or lasers, compliance is checked according to EN 60825-1.

NOTE 1 - If equipment falling within the scope of EN 60950 is inherently a class 1 laser product, i.e. it contains no embedded laser or LED of a higher class number, then a laser warning label or other laser warning statement is not required (see 1.1 of EN 60825-1).

Renumber the NOTE below the third compliance paragraph as NOTE 2.

Annex H **Replace** the last paragraph of this annex by:

At any point 10 cm from the surface of the OPERATOR ACCESS AREA the dose rate shall not exceed 1 μ Sv/h (0,1 mR/h) (see note). Account is taken of the background level.

Replace the NOTE as follows:

NOTE – These values appear in Directive 96/29/Euratom.

Annex P **Replace** the text of this annex by:

See annex ZA.

Annex Q **Add** the following notes for the standards indicated:

IEC 60127 series	NOTE: Harmonized as EN 60127 series (not modified)
IEC 60269-2-1	NOTE: Harmonized as HD 630.2.1 S2:1997 (modified)
IEC 60529	NOTE: Harmonized as EN 60529:1991 (not modified)
IEC 61032	NOTE: Harmonized as EN 61032:1998 (not modified)

Annex ZA (normative)

Normative references to international publications
with their relevant European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD appl.

Publication	Year	Title	EN/HD	Year
IEC 60050-151	1978	International Electrotechnical Vocabulary Chapter 151: Electrical and magnetic devices		
IEC 60050-195	1998	International Electrotechnical Vocabulary Chapter 195: Earthing and protection against electric shock		
IEC 60065 (mod)	1985	Safety requirements for mains operated electronic and related apparatus for household and similar general use	EN 60065 ¹⁾ + corr. Nov.	1993 1993
IEC 60073	1996	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicating devices and actuators	EN 60073	1996
IEC 60085	1984	Thermal evaluation and classification of electrical insulation	HD 566 S1	1990
IEC 60112	1979	Methods for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions	HD 214 S2	1980
IEC 60227 (mod)	Series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750V	HD 21 ²⁾	Series
IEC 60245 (mod)	Series	Rubber insulated cables of rated voltages up to and including 450/750V	HD 22 ³⁾	Series
IEC 60309	Series	Plugs, socket-outlets and couplers for industrial purposes	EN 60309	Series
IEC 60320 (mod)	Series	Appliance couplers for household and similar general purposes	EN 60320	Series
IEC 60364-3 (mod)	1993	Electrical installations of buildings - Part 3: Assessment of general characteristics	HD 384.3 S2	1995
IEC 60364-4-41 (mod)	1992	Electrical installations of buildings - Part 4: Protection for safety - Chapter 41: Protection against electric shock	HD 384.4.41 S2	1996
IEC 60384-14	1993	Fixed capacitors for use in electronic equipment - Part 14: Sectional specification: Fixed capacitors for radio interference suppression. Selection of methods of test and general requirements		

¹⁾ EN 60065:1993 is superseded by EN 60065:1998 + corrigendum June 1999, which is based on IEC 60065:1998, mod.

²⁾ The HD 21 series is related to, but not directly equivalent with the IEC 60227 series.

³⁾ The HD 22 series is related to, but not directly equivalent with the IEC 60245 series.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60417-1	1998	Graphical symbols for use on equipment Part 1: Overview and application	EN 60417-1	1999
IEC 60417-2	1998	Graphical symbols for use on equipment Part 2: Symbol originals	EN 60417-2	1999
IEC 60664-1 (mod)	1992	Insulation co-ordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. Nov.	1996 1996
IEC 60695-2-1/1 + corr. May	1994 1995	Fire hazard testing - Part 2: Test methods - Section 1/sheet 1: Glow-wire end-product test and guidance	EN 60695-2-2/1	1996
IEC 60695-2-2	1991	Fire hazard testing - Part 2: Test methods - Section 2: Needle-flame test	EN 60695-2-2	1994
IEC 60695-10-2	1995	Fire hazard testing - Part 10: Guidance and test methods for the minimization of the effects of abnormal heat on electrotechnical products involved in fires - Section 2: Method for testing products made from non-metallic materials for resistance to heat using the ball pressure test.		
IEC 60730-1 (mod)	1993	Automatic electrical controls for household and similar use - Part 1: General requirements	EN 60730-1	1995
IEC 60825-1	1993	Safety of laser products - Part 1: Equipment classification, requirements and user guide	EN 60825-1 + corr. Feb. + A11	1994 1995 1996
IEC 60851-3	1996	Winding wires - Test methods - Part 3: Mechanical properties	EN 60851-3	1996
IEC 60851-5	1996	Winding wires - Test methods - Part 5: Electrical properties	EN 60851-5	1996
IEC 60851-6	1996	Methods of test for winding wires - Part 6: Thermal properties	EN 60851-6	1996
IEC 60885-1	1987	Electrical test methods for electric cables Part 1: Electrical tests for cables, cords and wires up to and including 450/750 V		
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61058-1	1996	Switches for appliances - Part 1: General requirements		
ISO 261	1973	ISO general purpose metric screw threads - General plan		
ISO 262	1973	ISO general purpose metric screw threads - Selected sizes for screws, bolts and nuts		
ISO 3864	1984	Safety colours and safety signs		
ISO 4046	1978	Paper, board, pulp and related terms - Vocabulary		
ISO 7000	1989	Graphical symbols for use on equipment - Index and synopsis		

ITU-T Recommendation K.17: 1988, Tests on power-fed repeaters using solid-state devices in order to check the arrangements for protection from external interference.

ITU-T Recommendation K.21: 1996, Resistibility of subscribers' terminals to overvoltages and overcurrents.

Annex ZB (normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions. If it affects harmonization, it forms part of the European Standard.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

<u>Clause</u>	<u>Special national condition</u>
	<p>In Denmark, certain types of Class I appliances (see subclause 3.2.1) may be provided with a plug not establishing earthing continuity when inserted into Danish socket-outlets.</p>
	<p>In Norway, due to the IT power system used (see annex V, figure V.7), capacitors are required to be rated for the applicable phase-to-phase voltage (230 V).</p>
	<p>In Norway, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a communication network shall, if safety relies on connection to protective earth, require a marking stating that the equipment must be connected to an earthed mains socket-outlet.</p>
	<p>In Sweden, if the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet.</p>
	<p>The marking text shall be in Swedish and as follows:</p>
	<p>"Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk."</p>
	<p>In Denmark, socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment.</p>
	<p>In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.</p>
	<p>In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.</p>
	<p>In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.</p>
	<p>In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.</p>
2.10.3.1	<p>In Norway, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.</p>
	<p>In Denmark, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to the Heavy Current Regulations Section 107-2-D1.</p>
	<p>CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a.</p>
	<p>If poly-phase equipment and single-phase equipment having a RATED CURRENT exceeding 10 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations Section 107-2-D1 or EN 60309-2.</p>

Clause Special national condition

3.2.1 **In Spain**, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994

(cont'd)

Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993

CLASS I EQUIPMENT provided with socket-outlets with earth contacts, or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994.

If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.

In Switzerland, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 884-1 and one of the following dimension sheets:

SEV 6532-2.1991	Plug Type 15	3P+N+PE	250/400 V, 10 A
SEV 6533-2.1991	Plug Type 11	L+N	250 V, 10 A
SEV 6534-2.1991	Plug Type 12	L+N+PE	250 V, 10 A

In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998:

SEV 5932-2.1998	Plug Type 25	3L+N+PE	230/400 V, 16 A
SEV 5933-2.1998	Plug Type 21	L+N	250 V, 16 A
SEV 5934-2.1998	Plug Type 23	L+N+PE	250 V, 16 A

In Ireland, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 – National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997.

In the United Kingdom, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations.

NOTE: 'standard plug' is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.

3.2.5 **In the United Kingdom**, a power supply cord with conductor of 1,25 mm² is allowed for equipment with a rated current over 10 A and up to and including 13 A.

3.3.4 **In the United Kingdom**, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is:
- 1,25 mm² to 1,5 mm² nominal cross-sectional area.

Clause Special national condition

In **Ireland**, DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 – National Standards Authority of Ireland (Section 28)(Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.

In the **United Kingdom**, the torque test is performed using a socket outlet complying with BS 1363 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C.

6.1.2.1 In **Norway and Sweden**, add the following text between the first and second paragraph:

If this insulation is solid, including insulation forming part of a component, it shall at least consist of either

two layers of thin sheet material, each of which shall pass the electric strength test below, or
one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below.

If this insulation forms part of a semiconductor component e.g. an optocoupler, there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition:

passes the tests and inspection criteria of 2.10.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.7 shall be performed using 1,5 kV); and

is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV.

It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2.

6.1.2.2 In **Finland, Norway and Sweden**, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.

In **Norway**, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.

Annex ZC (informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC member.

This European Standard falls under Directive 73/23/EEC.

NOTE (from CEN/CENELEC IR Part 2, 3.1.9) Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No. C 59, 9.3.1982) that the effect of the decision of the Court of Justice in case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p.3583) is that compliance with A-deviations is no longer mandatory and that free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided in the relevant Directive.

A-deviations in an EFTA-country are valid instead of the relevant provisions of the European Standard in that country until they have been removed.

<u>Clause</u>	<u>Deviation</u>
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	Sweden (Ordinance SFS 1991:1290)
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Add the following:

NOTE In Sweden, switches containing mercury such as thermostats, relays and level controllers are not allowed.

	Switzerland (Ordinance on environmentally hazardous substances SR 814.013, Annex 3.2, Mercury)
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Add the following:

NOTE: In Switzerland, switches containing mercury such as thermostats, relays and level controllers are not allowed.

	Denmark (Heavy Current Regulations)
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Supply cords of CLASS I EQUIPMENT, which is delivered without a plug, must be provided with a visible tag with the following text:

**"Vigtigt!
Lederen med grøn/gul isolation
må kun tilsluttes en klemme mærket**



eller



If essential for the safety of the equipment, the tag must in addition be provided with a diagram, which shows the connection of the other conductors, or be provided with the following text:

"For tilslutning af de øvrige ledere, se medfølgende installationsvejledning."

1.7.5	Denmark (Heavy Current Regulations)
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CLASS II EQUIPMENT shall not be fitted with socket-outlets for providing power to other equipment.

Clause	Deviation
1.7.12	<p>Germany (Gesetz über technische Arbeitsmittel (Gerätesicherheitsgesetz) [Law on technical labour equipment {Equipment safety law}], of 23rd October 1992, Article 3, 3rd paragraph, 2nd sentence, together with the "Allgemeine Verwaltungsvorschrift zur Durchführung des Zweiten Abschnitts des Gerätesicherheitsgesetzes" [General administrative regulation on the execution of the Second Section of the Equipment safety law], of 10th January 1996, article 2, 4th paragraph, item 2).</p> <p>Directions for use with rules to prevent certain hazards for (among others) maintenance of the technical labour equipment, also for imported technical labour equipment shall be written in the German language.</p> <p>NOTE Of this requirement, rules for use even only by service personnel are not exempted.</p>
1.7.15	<p>Switzerland (Ordinance on environmentally hazardous substances SR 814.013)</p> <p>Annex 4.10 of SR 814.013 applies for batteries.</p>
Annex H	<p>Germany (Regulation on protection against hazards by X-ray, of 8th January 1987, Article 5 [Operation of X-ray emission source], clauses 1 to 4)</p> <p>a) A licence is required by those who operate an X-ray emission source.</p> <p>b) A licence in accordance with clause 1 is not required by those who operate an X-ray emission source on which the electron acceleration voltage does not exceed 20 kV if</p> <ol style="list-style-type: none">1) the local dose rate at a distance of 0,1 m from the surface does not exceed 1 µSv/h and2) it is adequately indicated on the X-ray emission source that<ol style="list-style-type: none">i) X-rays are generated andii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. <p>c) A licence in accordance with clause 1 is also not required by persons who operate an X-ray emission source on which the electron acceleration voltage exceeds 20 kV if</p> <ol style="list-style-type: none">1) the X-ray emission source has been granted a type approval and2) it is adequately indicated on the X-ray emission source that<ol style="list-style-type: none">i) X-rays are generated,ii) the device stipulated by the manufacturer or importer guarantees that the maximum permissible local dose rate in accordance with the type approval is not exceeded andiii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. <p>d) Furthermore, a licence in accordance with clause 1 is also not required by persons who operate X-ray emission sources on which the electron acceleration voltage does not exceed 30 kV if</p> <ol style="list-style-type: none">1) the X-rays are generated only by intrinsically safe CRTs complying with Enclosure III, No. 6,2) the values stipulated in accordance with Enclosure III, No. 6.2 are limited by technical measures and specified in the device and3) it is adequately indicated on the X-ray emission source that the X-rays generated are adequately screened by the intrinsically safe CRT.