SVENSK STANDARD SS-EN 60950-1

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2002-02-11	1	1 (1+284)	SEK Område 74

Svenska Elektriska Kommissionen, SEK

Utrustning för informationsbehandling – Säkerhet – Del 1: Allmänna fordringar

Information technology equipment – Safety – Part 1: General requirements

Som svensk standard gäller europastandarden EN 60950-1:2001. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60950-1:2001.

Nationellt förord

Europastandarden EN 60950-1:2001

består av:

- **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
- **IEC 60950-1, First edition, 2001 - Information technology equipment - Safety - Part 1: General requirements**

  utarbetad inom International Electrotechnical Commission, IEC.

I bilaga ZB redovisas svenska avvikelser, vilka av CENELEC accepterats till följd av speciella nationella förhållanden.

I bilaga ZC redovisas en svensk avvikelse, vilken av CENELEC noterats vara föranledd av svenska myndigheters föreskrifter.

SS-EN 60950, utgåva 6, 2000, gäller ej fr o m 2006-07-01.

ICS 35.020; 35.260

Denna standard är fastställd av Svenska Elektriska Kommissionen, SEK,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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EUROPEAN STANDARD **EN 60950-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM December 2001

ICS 35.020;35.260 Supersedes EN 60950:2000

English version

Information technology equipment - Safety Part 1: General requirements

(IEC 60950-1:2001, modified)

Matériels de traitement de l'information - Sécurité
Partie 1: Prescriptions générales
(CEI 60950-1:2001, modifiée)

Einrichtungen der Informationstechnik - Sicherheit
Teil 1: Allgemeine Anforderungen
(IEC 60950-1:2001, modifiziert)

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

Ref. No. EN 60950-1:2001 E

Foreword

The text of document 74/590/FDIS, future edition 1 of IEC 60950-1, prepared by IEC TC 74, Safety and energy efficiency of IT equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60950-1 on 2001-12-04.

A draft amendment, prepared by the Technical Committee CENELEC TC 74, Safety and energy efficiency of information technology equipment, was submitted to the formal vote and was approved by CENELEC for inclusion in EN 60950-1 on 2001-12-04.

This European Standard supersedes EN 60950:2000.

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)	2002-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2006-07-01

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, Y, ZA and ZB are normative and 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 the International Standard IEC 60950-1:2001 was approved by CENELEC as a European Standard with agreed common modifications as given below.

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 (including amendments).

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

Publication	Year	Title	EN/HD	Year
IEC 60050-151	-	International Electrotechnical Vocabulary Part 151: Electrical and magnetic devices	-	-
IEC 60050-195	-	Part 195: Earthing and protection against electric shock	-	-
IEC 60065 (mod)	1998	Audio, video and similar electronic apparatus - Safety requirements	EN 60065 + corr. June	1998 1999
IEC 60073	1996	Basic and safety principles for man-machine interface, marking and identification - Coding principles for indication devices and actuators	EN 60073	1996
IEC 60085	1984	Thermal evaluation and classification of electrical insulation	HD 566 S1	1990
IEC 60112	1979	Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions	HD 214 S2	1980
IEC 60216-4-1	1990	Guide for the determination of thermal endurance properties of electrical insulating materials - Part 4: Ageing ovens - Section 1: Single-chamber ovens	HD 611.4.1.S1	1992
IEC 60227 (mod)	Series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750V	HD 21 [1)]	Series
IEC 60245 (mod)	Series	Rubber insulated cables of rated voltages up to and including 450/750V	HD 22 [2)]	Series
IEC 60309	Series	Plugs, socket-outlets and couplers for industrial purposes	EN 60309	Series
IEC 60317-43	1997	Specifications for particular types of winding wires Part 43: Aromatic polyimide tape wrapped round copper wire, class 240	EN 60317-43	1997

1) The HD 21 series is related to, but not directly equivalent with the IEC 60227 series.
2) The HD 22 series is related to, but not directly equivalent with the IEC 60245 series.

Publication	Year	Title	EN/HD	Year
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 [3)]	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 electromagnetic interference suppression and connection to the supply mains	EN 132400 [4)] + A2 + A3 + A4	1994 1998 1998 2001
IEC 60417-1	-	Graphical symbols for use on equipment Part 1: Overview and application	EN 60417-1	-
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. November	1996 1996
IEC 60695-2-2	1991	Fire hazard testing - Part 2: Test methods - Section 2: Needle-flame test	EN 60695-2-2	1994
IEC 60695-2-11	2000	Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	2001
IEC 60695-2-20	1995	Part 2: Glowing/hot-wire based test methods Section 20: Hot-wire coil ignitability test on materials	-	-
IEC 60695-10-2	1995	Part 10-2: Guidance and test methods for the minimization of the effects of abnormal heat on electrotechnical products involved in fires - Method for testing products made from non - metallic materials for resistance to heat using the ball pressure test.	-	-
IEC 60695-11-3	2000	Part 11-3: Test flames - 500 W flames: Apparatus and confirmational test methods	-	-
IEC 60695-11-4	2000	Part 11-4: Test flames - 50 W flames: Apparatus and confirmational test methods	-	-
IEC 60695-11-10	1999	Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	1999
IEC 60695-11-20	1999	Part 11-20: Test flames - 500 W flame test methods	EN 60695-11-20	1999

3) IEC 60364-4-41:1992 is superseded by IEC 60364-4-41:2001.

4) EN 132400, *Sectional Specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains (Assessment level D),* and its amendments are related to, but not directly equivalent to IEC 60384-14.

Publication	Year	Title	EN/HD	Year
IEC 60730-1 (mod)	1999	Automatic electrical controls for household and similar use - Part 1: General requirements	EN 60730-1	2000
IEC 60825-1	1993	Safety of laser products - Part 1: Equipment classification, requirements and user's guide	EN 60825-1 + corr. February + A11 + corr. July	1994 1995 1996 1997
IEC 60825-2	2000	Part 2: Safety of optical fibre communication systems	EN 60825-2	2000
IEC 60825-9	1999	Part 9: Compilation of maximum permissible exposure to incoherent optical radiation	-	-
IEC 60851-3	1996	Winding wires - Test methods - Part 3: Mechanical properties	EN 60851-3	1996
IEC 60851-5	1996	Part 5: Electrical properties	EN 60851-5	1996
IEC 60851-6	1996	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 for voltages 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	2000	Switches for appliances - Part 1: General requirements	-	-
IEC 61965	2000	Mechanical safety of caray tubes	EN 61965	2001
ISO 178	1993	Plastics - Determination of flexural properties	EN ISO 178	1996
ISO 179	Series	Plastics - Determination of Charpy impact strength	EN ISO 179	Series
ISO 180	1993	Plastics - Determination of Izod impact strength	EN ISO 180	2000
ISO 261	1998	ISO general-purpose metric screw threads - General plan	-	-
ISO 262	1998	ISO general-purpose metric screw threads - Selected sizes for screws, bolts and nuts	-	-
ISO 527	Series	Plastics - Determination of tensile properties	EN ISO 527	Series
ISO 3864	1984	Safety colours and safety signs	-	-
ISO 4892	Series	Plastics - Methods of exposure to laboratory light sources	EN ISO 4892	Series
ISO 7000	1989	Graphical symbols for use on equipment - Index and synopsis	-	-

Publication	Year	Title	EN/HD	Year
ISO 8256	1990	Plastics - Determination of tensile-impact strength	EN ISO 8256	1996
ISO 9772	1994	Cellular plastics - Determination of horizontal burning characteristics of small specimens subjected to a small flame	-	-
ISO 9773	1998	Plastics - Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source	EN ISO 9773	1998
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	2000	Resistibility of telecommunication equipment installed in customer's premises to overvoltages and overcurrents	-	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INFORMATION TECHNOLOGY EQUIPMENT – SAFETY –

Part 1: General requirements

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60950-1 has been prepared by IEC technical committee 74: Safety and energy efficiency of IT equipment.

This first edition of IEC 60950-1 cancels and replaces the third edition of IEC 60950, issued in 1999, and constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
74/590/FDIS	74/596/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this publication will remain unchanged until 2004-11. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IEC 60950-1 includes the basic requirements for the safety of Information Technology equipment.

Additional parts cover specific safety requirements for Information Technology equipment having limited applications or having special features as follows:

Part 21: Remote feeding.

Annexes A, B, C, D, E, F, G, H, J, K, L, M, N, P, U, V and Y form an integral part of this standard.

Annexes Q, R, S, T, W and X are for information only.

In this standard, the following print types are used:

– Requirements proper and normative annexes: in roman type.
– *Compliance statements and test specifications: in italic type*.
– Notes and other informative matter: in smaller roman type.
– Normative conditions within tables: in smaller roman type.
– Terms that are defined in 1.2: SMALL CAPITALS.

INTRODUCTION

0 Principles of safety

The following principles have been adopted by technical committee 74 in the development of this standard.

These principles do not cover performance or functional characteristics of equipment.

Words printed in SMALL CAPITALS are terms that are defined in 1.2 of this standard.

0.1 General principles of safety

It is essential that designers understand the underlying principles of safety requirements in order that they can engineer safe equipment.

These principles are not an alternative to the detailed requirements of this standard, but are intended to provide designers with an appreciation of the basis of these requirements. Where the equipment involves technologies and materials or methods of construction not specifically covered, the design of the equipment should provide a level of safety not less than those described in these principles of safety.

Designers shall take into account not only normal operating conditions of the equipment but also likely fault conditions, consequential faults, foreseeable misuse and external influences such as temperature, altitude, pollution, moisture, overvoltages on the mains and over-voltages on a TELECOMMUNICATION NETWORK or a CABLE DISTRIBUTION SYSTEM.

The following priorities should be observed in determining what design measures to adopt:

– where possible, specify design criteria that will eliminate, reduce or guard against hazards;
– where the above is not practicable because the functioning of the equipment would be impaired, specify the use of protective means independent of the equipment, such as personal protective equipment (which is not specified in this standard);
– where neither of the above measures is practicable, or in addition to those measures, specify the provision of markings and instructions regarding the residual risks.

There are two types of persons whose safety needs to be considered, USERS (or OPERATORS) and SERVICE PERSONS.

USER is the term applied to all persons other than SERVICE PERSONS. Requirements for protection should assume that USERS are not trained to identify hazards, but will not intentionally create a hazardous situation. Consequently, the requirements will provide protection for cleaners and casual visitors as well as the assigned USERS. In general, USERS should not have access to hazardous parts, and to this end, such parts should only be in SERVICE ACCESS AREAS or in equipment located in RESTRICTED ACCESS LOCATIONS.

When USERS are admitted to RESTRICTED ACCESS LOCATIONS they shall be suitably instructed.

SERVICE PERSONS are expected to use their training and skill to avoid possible injury to hemselves and others due to obvious hazards which exist in SERVICE ACCESS AREAS of the equipment or on equipment located in RESTRICTED ACCESS LOCATIONS. However, SERVICE PERSONS should be protected against unexpected hazards. This can be done by, for example, locating parts that need to be accessible for servicing away from electrical and mechanical hazards, providing shields to avoid accidental contact with hazardous parts, and providing labels or instructions to warn personnel about any residual risk.

Information about potential hazards can be marked on the equipment or provided with the equipment, depending on the likelihood and severity of injury, or made available for SERVICE PERSONS. In general, USERS shall not be exposed to hazards likely to cause injury, and information provided for USERS should primarily aim at avoiding misuse and situations likely to create hazards, such as connection to the wrong power source and replacement of fuses by incorrect types.

MOVABLE EQUIPMENT is considered to present a slightly increased risk of shock, due to possible extra strain on the supply cord leading to rupture of the earthing conductor. With HAND-HELD EQUIPMENT, this risk is increased; wear on the cord is more likely, and further hazards could arise if the units were dropped. TRANSPORTABLE EQUIPMENT introduces a further factor because it can be used and carried in any orientation; if a small metallic object enters an opening in the ENCLOSURE it can move around inside the equipment, possibly creating a hazard.

0.2 Hazards

Application of a safety standard is intended to reduce the risk of injury or damage due to the following:

– electric shock;
– energy related hazards;
– fire;
– heat related hazards;
– mechanical hazards;
– radiation;
– chemical hazards.

0.2.1 Electric shock

Electric shock is due to current passing through the human body. The resulting physiological effects depend on the value and duration of the current and the path it takes through the body. The value of the current depends on the applied voltage, the impedance of the source and the impedance of the body. The body impedance depends in turn on the area of contact, moisture in the area of contact and the applied voltage and frequency. Currents of approximately half a milliampere can cause a reaction in persons in good health and may cause injury indirectly due to involuntary reaction. Higher currents can have more direct effects, such as burn, muscle tetanization or ventricular fibrillation.

Steady state voltages up to 42,4 V peak, or 60 V d.c., are not generally regarded as hazardous under dry conditions for an area of contact equivalent to a human hand. Bare parts which have to be touched or handled should be at earth potential or properly insulated.

Some equipment will be connected to telephone and other external networks. Some TELECOMMUNICATION NETWORKS operate with signals such as voice and ringing superimposed on a steady DC VOLTAGE; the total may exceed the values given above for steady-state voltages. It is common practice for the SERVICE PERSONS of telephone companies to handle parts of such circuits bare-handed. This has not caused serious injury, because of the use of cadenced ringing and because there are limited areas of contact with bare conductors normally handled by SERVICE PERSONS. However, the area of contact of a part accessible to the USER, and the likelihood of the part being touched, should be further limited (for example, by the shape and location of the part).

It is normal to provide two levels of protection for USERS to prevent electric shock. Therefore, the operation of equipment under normal conditions and after a single fault, including any consequential faults, should not create a shock hazard. However, provision of additional protective measures, such as protective earthing or SUPPLEMENTARY INSULATION, is not considered a substitute for, or a relief from, properly designed BASIC INSULATION.

Harm may result from:	Examples of measures to reduce risks:
Contact with bare parts normally at HAZARDOUS VOLTAGES.	Prevent USER access to parts at HAZARDOUS VOLTAGES by fixed or locked covers, SAFETY INTERLOCKS, etc. Discharge accessible capacitors that are at HAZARDOUS VOLTAGES.
Breakdown of insulation between parts normally at HAZARDOUS VOLTAGES and accessible conductive parts.	Provide BASIC INSULATION and connect the accessible conductive parts and circuits to earth so that exposure to the voltage which can develop is limited because overcurrent protection will disconnect the parts having low impedance faults within a specified time; or provide a metal screen connected to protective earth between the parts, or provide DOUBLE INSULATION or REINFORCED INSULATION between the parts, so that breakdown to the accessible part is not likely to occur.
Contact with circuits connected to TELECOMMUNICATION NETWORKS which exceed 42,4 V peak or 60 V d.c.	Limit the accessibility and area of contact of such circuits, and separate them from unearthed parts to which access is not limited.
Breakdown of USER-accessible insulation.	Insulation which is accessible to the USER should have adequate mechanical and electrical strength to reduce the likelihood of contact with HAZARDOUS VOLTAGES.
TOUCH CURRENT (leakage current) flowing from parts at HAZARDOUS VOLTAGES to accessible parts, or failure of a protective earthing connection. TOUCH CURRENT may include current due to EMC filter components connected between PRIMARY CIRCUITS and accessible parts.	Limit TOUCH CURRENT to a specified value, or provide a high integrity protective earthing connection.

0.2.2 Energy related hazards

Injury or fire may result from a short circuit between adjacent poles of high current supplies or high capacitance circuits, causing:

– burns;
– arcing;
– ejection of molten metal.

Even circuits whose voltages are safe to touch may be hazardous in this respect.

Examples of measures to reduce risks include:

– separation;
– shielding;
– provision of SAFETY INTERLOCKS.

0.2.3 Fire

Risk of fire may result from excessive temperatures either under normal operating conditions or due to overload, component failure, insulation breakdown or loose connections. Fires originating within the equipment should not spread beyond the immediate vicinity of the source of the fire, nor cause damage to the surroundings of the equipment.

Examples of measures to reduce risks include:

– providing overcurrent protection;
– using constructional materials having appropriate flammability properties for their purpose;
– selection of parts, components and consumable materials to avoid high temperature which might cause ignition;
– limiting the quantity of combustible materials used;
– shielding or separating combustible materials from likely ignition sources;
– using ENCLOSURES or barriers to limit the spread of fire within the equipment;
– using suitable materials for ENCLOSURES so as to reduce the likelihood of fire spreading from the equipment.

0.2.4 Heat related hazards

Injury may result from high temperatures under normal operating conditions, causing:

– burns due to contact with hot accessible parts;
– degradation of insulation and of safety-critical components;
– ignition of flammable liquids.

Examples of measures to reduce risks include:

– taking steps to avoid high temperature of accessible parts;
– avoiding temperatures above the ignition point of liquids;
– provision of markings to warn USERS where access to hot parts is unavoidable.

0.2.5 Mechanical hazards

Injury may result from:

– sharp edges and corners;
– moving parts which have the potential to cause injury;
– equipment instability;
– flying particles from imploding cathode ray tubes and exploding high pressure lamps.

Examples of measures to reduce risks include:

– rounding of sharp edges and corners;
– guarding;
– provision of SAFETY INTERLOCKS;
– providing sufficient stability to free-standing equipment;
– selecting cathode ray tubes and high pressure lamps that are resistant to implosion and explosion respectively;
– provision of markings to warn USERS where access is unavoidable.

0.2.6 Radiation

Injury to USERS and to SERVICE PERSONS may result from some forms of radiation emitted by equipment. Examples are sonic (acoustic), radio frequency, infra-red, ultraviolet and ionizing radiation, and high intensity visible and coherent light (lasers).

Examples of measures to reduce risks include:

– limiting the energy level of potential radiation sources;
– screening radiation sources;
– provision of SAFETY INTERLOCKS;
– provision of markings to warn USERS where exposure to the radiation hazard is unavoidable.

0.2.7 Chemical hazards

Injury may result from contact with some chemicals or from inhalation of their vapours and fumes.

Examples of measures to reduce risks include:

– avoiding the use of constructional and consumable materials likely to cause injury by contact or inhalation during intended and normal conditions of use;
– avoiding conditions likely to cause leakage or vaporization;
– provision of markings to warn USERS about the hazards.

0.3 Materials and components

Materials and components used in the construction of equipment should be so selected and arranged that they can be expected to perform in a reliable manner for the anticipated life of the equipment without creating a hazard, and would not contribute significantly to the development of a serious fire hazard. Components should be selected so that they remain within their manufacturers' ratings under normal operating conditions, and do not create a hazard under fault conditions.

INFORMATION TECHNOLOGY EQUIPMENT – SAFETY –

Part 1: General requirements

1 General

1.1 Scope

1.1.1 Equipment covered by this standard

This standard is applicable to mains-powered or battery-powered information technology equipment, including electrical business equipment and associated equipment, with a RATED VOLTAGE not exceeding 600 V.

This standard is also applicable to such information technology equipment:

– designed for use as telecommunication terminal equipment and TELECOMMUNICATION NETWORK infrastructure equipment, regardless of the source of power;

– designed and intended to be connected directly to, or used as infrastructure equipment in, a CABLE DISTRIBUTION SYSTEM, regardless of the source of power;

– designed to use the AC MAINS SUPPLY as a communication transmission medium (see note 4 of clause 6 and note 3 of clause 7).

This standard specifies requirements intended to reduce risks of fire, electric shock or injury for the OPERATOR and layman who may come into contact with the equipment and, where specifically stated, for a SERVICE PERSON.

This standard is intended to reduce such risks with respect to installed equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer.