SVENSK STANDARD SS-EN 60065

Fastställd	Utgåva	Sida	Ansvarig kommitté
2015-01-28	4	1 (1+189)	SEK TK 108

Audio-, video- och liknande elektronisk utrustning – Säkerhet

Audio, video and similar electronic apparatus – Safety requirements

Som svensk standard gäller europastandarden EN 60065:2014. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60065:2014.

Nationellt förord

Europastandarden EN 60065:2014

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60065, Eigth edition, 2014 - Audio, video and similar electronic apparatus - Safety requirements**

utarbetad inom International Electrotechnical Commission, IEC.

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

Tidigare fastställd svensk standard SS-EN 60065, utgåva 3, 2002, SS-EN 60065/A1, utgåva 1, 2006, SS-EN 60065/A11, utgåva 1, 2008, SS-EN 60065/A12, utgåva 1, 2011, SS-EN 60065/A2, utgåva 1, 2010 och SS-EN 60065 C1, utgåva 1, 2006, gäller ej fr o m 2017-11-17.

ICS 97.020.00

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

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60065

December 2014

ICS 97.020

Supersedes EN 60065:2002

English Version

Audio, video and similar electronic apparatus - Safety requirements (IEC 60065:2014, modified)

Appareils audio, vidéo et appareils électroniques analogues - Exigences de sécurité (CEI 60065:2014, modifiée)

Audio-, Video- und ähnliche elektronische Geräte - Sicherheitsanforderungen (IEC 60065:2014, modifiziert)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60065:2014 E

SEK Svensk Elstandard

Foreword

This document (EN 60065:2014) consists of the text of IEC 60065:2014 prepared by IEC/TC 108 "Safety of electronic equipment within the field of audio/video, information technology and communication technology", together with the common modifications prepared by CLC/TC 108X "Safety of electronic equipment within the fields of Audio/Video, Information Technology and Communication Technology".

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-11-17
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-11-17

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

EN 60065:2014 supersedes EN 60065:2002.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60065:2014 are prefixed “Z”.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 60065:2014 was approved by CENELEC as a European Standard with the following common modifications.

Add the following annexes.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
-	-	Safety of toys - Part 1: Mechanical and physical properties	EN 71-1	-
-	-	Sound system equipment: Headphones and earphones associated with personal music players - Maximum sound pressure level measurement methodology - Part 1: General method for "one package equipment"	EN 50332-1	-
-	-	Sound system equipment: Headphones and earphones associated with personal music players - Maximum sound pressure level measurement methodology - Part 2: Matching of sets with headphones if either or both are offered separately, or are offered as one package equipment but with standardised connectors between the two allowing to combine components of different manufacturers or different design	EN 50332-2	-
IEC 60027	series	Letter symbols to be used in electrical technology	EN 60027	series
IEC 60038 (mod)	2009	IEC standard voltages	EN 60038	2011
IEC 60068-2-6	2007	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008
IEC 60068-2-31	2008	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	2008
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-

Publication	Year	Title	EN/HD	Year
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60086-4	-	Primary batteries - Part 4: Safety of lithium batteries	EN 60086-4	-
IEC 60107-1	1997	Methods of measurement on receivers for television broadcast transmissions - Part 1: General considerations - Measurements at radio and video frequencies	EN 60107-1	1997
IEC 60112 + corr. June + corr. October + A1	2003 2003 2003 2009	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112 - - + A1	2003 - - 2009
IEC 60127	series	Miniature fuses	EN 60127	series
IEC 60127-6	-	Miniature fuses - Part 6: Fuse-holders for miniature cartridge fuse-links	EN 60127-6	-
IEC 60167	1964	Methods of test for the determination of the insulation resistance of solid insulating materials	HD 568 S1 [1)]	1990
IEC 60216	series	Electrical insulating materials - Thermal endurance properties	EN 60216	series
IEC 60227 (mod)	series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V	HD 21 [2)]	series
IEC 60227-2 + corr. April	1997 1998	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 2: Test methods	-	-
IEC 60245	series	Rubber insulated cables - Rated voltages up to and including 450/750 V	-	-
IEC 60249-2	series	Base materials for printed circuits - Part 2: Specifications	-	-
IEC 60268-1	1985	Sound system equipment - Part 1: General	HD 483.1 S2 [3)]	1989

1) HD 568 S1:1990 is partially superseded by EN 62631-1:2011, which is based on IEC 62631-1:2011.

2) The HD 21 series is related to, but not directly equivalent with the IEC 60227 series. Also EN 50363, EN 50395 and EN 50396 are to be taken into account.

3) HD 483.1 S2:1989 includes A1:1998 to IEC 60268-1:1985.

Publication	Year	Title	EN/HD	Year
IEC 60317-43	-	Specifications for particular types of winding wires - Part 43: Aromatic polyimide tape wrapped round copper wire, class 240	EN 60317-43	-
IEC 60320	series	Appliance couplers for household and similar general purposes	EN 60320	series
IEC 60320-1	-	Appliance couplers for household and similar general purposes - Part 1: General requirements	EN 60320-1	-
IEC 60335-1	-	Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1	-
IEC 60384-1 + corr. November	2008 2008	Fixed capacitors for use in electronic equipment - Part 1: Generic specification	EN 60384-1 -	2009 -
IEC 60384-14	2005	Fixed capacitors for use in electronic equipment - Part 14: Sectional specification - Fixed capacitors for electromagnetic interference suppression and connection to the supply mains	EN 60384-14 4)	2005
IEC 60410	1973	Sampling plans and procedures for inspection by attributes	-	-
IEC 60417-DB		Graphical symbols for use on equipment, *available from:* <*http://www.graphical-symbols.info/equipment*>	-	-
IEC 60454	series	Pressure-sensitive adhesive tapes for electrical purposes	EN 60454	series
IEC 60529 -	1989 -	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60664-3	-	Insulation coordination for equipment within low-voltage systems - Part 3: Use of coating, potting or moulding for protection against pollution	EN 60664-3	-
IEC 60691	2002	Thermal-links - Requirements and application guide	EN 60691	2003
IEC 60695-11-5	2004	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2005

4) EN 60384-14:2005 is superseded by EN 60384-14:2013, which is based on IEC 60384-14:2013.

Publication	Year	Title	EN/HD	Year
IEC 60695-11-10	2013	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	2013
IEC 60730-1 (mod)	2010	Automatic electrical controls for household and similar use - Part 1: General requirements	EN 60730-1	2011
IEC 60747-5-5 + A1	2007 2013	Semiconductor devices - Discrete devices - Part 5-5: Optoelectronic devices - Photocouplers	EN 60747-5-5 -	2011 -
IEC 60825-1 + corr. August	2007 2008	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1 [5)]	2007
IEC 60851-3	2009	Winding wires - Test methods - Part 3: Mechanical properties	EN 60851-3	2009
IEC 60851-5	2008	Winding wires - Test methods - Part 5: Electrical properties	EN 60851-5	2008
IEC 60851-6	2012	Winding wires - Test methods - Part 6: Thermal properties	EN 60851-6	2012
IEC 60906	series	IEC system of plugs and socket-outlets for household and similar purposes	-	-
IEC 60950-1 (mod) + corr. August - + corr. August - + A1 (mod) + corr. August - + A2 (mod)	2005 2006 - 2013 - 2009 2012 - 2013	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1 - + AC:2011 - + A11 + A1 - + A12 + A2	2006 - 2011 - 2009 2010 - 2011 2013
IEC 60990	-	Methods of measurement of touch current and protective conductor current	EN 60990	-
IEC 60998-2-2	-	Connecting devices for low-voltage circuits for household and similar purposes - Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units	EN 60998-2-2	-
IEC 60999-1	-	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units - Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)	EN 60999-1	-

5) EN 60825-1:2007 is superseded by EN 60825-1:2014, which is based on IEC 60825-1:2014.

Publication	Year	Title	EN/HD	Year
IEC 60999-2	-	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units - Part 2: Particular requirements for clamping units for conductors above 35 mm² up to 300 mm² (included)	EN 60999-2	-
IEC 61032 + corr. January	1997 2003	Protection of persons and equipment by enclosures - Probes for verification	EN 61032 -	1998 -
IEC 61051-2 + A1	1991 2009	Varistors for use in electronic equipment - Part 2: Sectional specification for surge suppression varistors	-	-
IEC 61058-1 (mod) + corr. January	2000 2009	Switches for appliances - Part 1: General requirements	EN 61058-1 [6)] -	2002 -
IEC/TR 61149	-	Guide for safe handling and operation of mobile radio equipment	-	-
IEC 61260	-	Electroacoustics - Octave-band and fractional-octave-band filters	EN 61260	-
IEC 61293	-	Marking of electrical equipment with ratings related to electrical supply - Safety requirements	EN 61293	-
IEC 61558-1 - + corr. March + corr. March + corr. April + A1	2005 - 2008 2010 2011 2009	Safety of power transformers, power supplies, reactors and similar products - Part 1: General requirements and tests	EN 61558-1 + corr. August - - - + A1	2005 2006 - - - 2009
IEC 61558-2-16	-	Safety of transformers, reactors, power supply units and similar products for voltages up to 1 100 V - Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units	EN 61558-2-16	-
IEC 61965	-	Mechanical safety of cathode ray tubes	EN 61965	-
IEC 62133	-	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications	EN 62133	-
IEC 62151 + corr. March + corr. June	2000 2001 2001	Safety of equipment electrically connected to a telecommunication network	-	-

6) EN 61058-1:2002 includes A1:2001 to IEC 61058-1:2000 (mod).

Publication	Year	Title	EN/HD	Year
IEC 62368-1	-	Audio/video, information and communication technology equipment - Part 1: Safety requirements	EN 62368-1	-
IEC 62471 (mod)	2006	Photobiological safety of lamps and lamp systems	EN 62471	2008
IEC Guide 104	-	The preparation of safety publications and the use of basic safety publications and group safety publications	-	-
IEC Guide 112	-	Guide on the safety of multimedia equipment	-	-
ISO 261	-	ISO general-purpose metric screw threads - General plan	-	-
ISO 262	-	ISO general-purpose metric screw threads - Selected sizes for screws, bolts and nuts	-	-
ISO 306	2004	Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST)	EN ISO 306 7)	2004
ISO 2859-1 + corr. March	1999 2001	Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection	-	-
ISO 7000 DB		Graphical symbols for use on equipment - Registered symbols, *available from:* <http://www.graphical-symbols.info/equipment>	-	-
ISO 9773	-	Plastics - Determination of burning behaviour of flexible vertical specimens in contact with a small-flame ignition source	-	-
ITU-T Recommendation K.44	-	Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents - Basic Recommendation	-	-

7) EN ISO 306:2004 is superseded by EN ISO 306:2013, which is based on ISO 306:2013.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUDIO, VIDEO AND SIMILAR ELECTRONIC APPARATUS – SAFETY REQUIREMENTS

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60065 has been prepared by IEC technical committee 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology. It has the status of a group safety publication in accordance with IEC Guide 104.

This eighth edition cancels and replaces the seventh edition published in 2001 including its Amendment 1 (2005) and Amendment 2 (2010). It constitutes a technical revision.

The principal changes in this edition as compared with the seventh edition are as follows:

– new requirements for wall and ceiling mounting means;
– new requirements for coin / button cell batteries;
– all notes have been reviewed to comply with the new directives;
– addition of requirements for LEDs;
– requirements for creepage distances are aligned with IEC 60950-1;
– change in optocoupler requirements.

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

FDIS	Report on voting
108/523/FDIS	108/541/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types or formats are used:

– requirements proper and normative annexes: in roman type;

– compliance statements and test specifications: *italic type;*

– notes/explanatory matter: in smaller roman type;

– normative conditions within tables: in smaller roman type;

– terms defined in Clause 2: SMALL CAPITALS.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

INTRODUCTION

Principles of safety

General

This introduction is intended to provide an appreciation of the principles on which the requirements of this standard are based. Such an understanding is essential in order that safe apparatus can be designed and manufactured.

The requirements of this standard are intended to provide protection to persons as well as to the surroundings of the apparatus.

Attention is drawn to the principle that the requirements, which are standardized, are the minimum considered necessary to establish a satisfactory level of safety.

Further development in techniques and technologies may entail the need for future modification of this standard.

NOTE The expression "protection to the surroundings of the apparatus" implies that this protection should also include protection of the natural environment in which the apparatus is intended to be used, taking into account the life cycle of the apparatus, i.e. manufacturing, use, maintenance, disposal and possible end-of-life recycling of parts of the apparatus.

Hazards

The application of this standard is intended to prevent injury or damage due to the following hazards:

– electric shock;
– excessive temperatures;
– radiation;
– implosion;
– mechanical hazards;
– fire;
– chemical burns (for example, as a result of the ingestion of lithium chemistry button/coin cells).

Electric shock

Electric shock is due to current passing through the human body. Currents of the order of a milliampere can cause a reaction in persons in good health and may cause secondary risks due to involuntary reaction. Higher currents can have more damaging effects. Voltages below certain limits are generally regarded as not dangerous under specified conditions. In order to provide protection against the possibility of higher voltages appearing on parts that may be touched or handled, such parts are either earthed or adequately insulated.

For parts which can be touched, two levels of protection are normally provided to prevent electric shock caused by a single fault. Thus a single fault and any consequential faults will not create a hazard. The provision of additional protective measures, such as SUPPLEMENTARY INSULATION or protective earthing, is not considered a substitute for, or a relief from, properly designed BASIC INSULATION.

Cause	Prevention
Contacts with parts normally at hazardous voltage.	Prevent access to parts at hazardous voltage by fixed or locked covers, interlocks, etc. Discharge capacitors at hazardous voltages.
Breakdown of insulation between parts normally at hazardous voltage and accessible parts.	Either use double or reinforced insulation between parts normally at hazardous voltages and accessible parts so that breakdown is not likely to occur, or connect accessible conductive parts to protective earth so that the voltage which can develop is limited to a safe value. Provide adequate mechanical and electrical strength.
Breakdown of insulation between parts normally at hazardous voltage and circuits normally at non-hazardous voltages, thereby putting accessible parts and terminals at hazardous voltage.	Segregate hazardous and non-hazardous voltage circuits either by double or reinforced insulation so that breakdown is not likely to occur, or by a protective earthed screen, or connect the circuit normally at non-hazardous voltage to protective earth, so that the voltage which can develop is limited to a safe value.
Touch current from parts at hazardous voltage through the human body. (Touch current can include current due to RFI filter components connected between mains supply circuits and accessible parts or terminals.)	Limit touch current to a safe value or provide a protective earthing connection to the accessible parts.

Excessive temperatures

Requirements are included to prevent injury due to excessive temperatures of accessible parts, to prevent damaging of insulation due to excessive internal temperatures, and to prevent mechanical instability due to excessive temperatures developed inside the apparatus.

Radiation

Requirements are included to prevent injury due to excessive energy levels of ionizing and laser radiation, for example by limiting the radiation to non-hazardous values.

Implosion

Requirements are included to prevent injury due to implosion of picture tubes.

Mechanical hazards

Requirements are included to ensure that the apparatus and its parts have adequate mechanical strength and stability, to avoid the presence of sharp edges and to provide guarding or interlocking of dangerous moving parts.

Fire

A fire can result from:

– heat;
– arcing;

caused by

– overloads;
– component failure;
– insulation breakdown;
– bad connections;
– conductor breakage.

Requirements are included that are intended to prevent fire originating within the apparatus from spreading beyond the immediate vicinity of the source of the fire or from causing damage to the surroundings of the apparatus.

The following preventive measures are recommended:

– the use of suitable components and subassemblies;
– the prevention of excessive temperature rise that might cause ignition under normal or fault conditions;
– the use of measures to eliminate POTENTIAL IGNITION SOURCES such as inadequate contacts, bad connections, interruptions;
– the limitation of the quantity of combustible material used;
– the control of the position of combustible materials in relation to POTENTIAL IGNITION SOURCES;
– the use of materials with high resistance to fire in the vicinity of POTENTIAL IGNITION SOURCES;
– the use of encapsulation or barriers to limit the spread of fire within the apparatus;
– the use of suitable fire retardant materials for the enclosure.

AUDIO, VIDEO AND SIMILAR ELECTRONIC APPARATUS – SAFETY REQUIREMENTS

1 General

1.1 Scope

1.1.1 This International Safety Standard applies to electronic apparatus designed to be fed from the MAINS, from a SUPPLY APPARATUS, from batteries or from REMOTE POWER FEEDING and intended for reception, generation, recording or reproduction of audio, video and associated signals. It also applies to apparatus designed to be used exclusively in combination with the above-mentioned apparatus.

This standard primarily concerns apparatus intended for household and similar general use but which may also be used in places of public assembly such as schools, theatres, places of worship and the workplace. PROFESSIONAL APPARATUS intended for use as described above is also covered unless falling specifically within the scope of other standards.

This standard concerns only safety aspects of the above apparatus; it does not concern other matters, such as style or performance.

This standard applies to the above-mentioned apparatus, if designed to be connected to the TELECOMMUNICATION NETWORK or similar network, for example by means of an integrated modem.

Some examples of apparatus within the scope of this standard are:

– receiving apparatus and amplifiers for sound and/or vision;
– independent LOAD TRANSDUCERS and SOURCE TRANSDUCERS;
– SUPPLY APPARATUS intended to supply other apparatus covered by the scope of this standard;
– ELECTRONIC MUSICAL INSTRUMENTS, and electronic accessories such as rhythm generators, tone generators, music tuners and the like for use with electronic or non-electronic musical instruments;
– audio and/or video educational apparatus;
– video projectors;

NOTE 1 Film projectors, slide projectors and overhead projectors are covered by IEC 60335-2-56.

– video cameras and video monitors;
– video games and flipper games;
– juke boxes;
– electronic gaming and scoring machines;

NOTE 2 Video games, flipper games and gaming machines and other amusement games for commercial use are covered by IEC 60335-2-82.

– teletext equipment;
– record and optical disc players;
– tape and optical disc recorders;
– antenna signal converters and amplifiers;
– antenna positioners;
– Citizen's Band apparatus;

– apparatus for IMAGERY;
– electronic light effect apparatus;
– apparatus for use in alarm systems;
– intercommunication apparatus, using low voltage MAINS as the transmission medium;
– cable head-end receivers;
– professional general use amplifiers, record or disc players, tape players, recorders, and public address systems;
– professional sound/video systems;
– electronic flash apparatus for photographic purposes (see Annex L); and
– multimedia apparatus.

The requirements of IEC 60950-1 may also be used to meet the requirements for safety of multimedia apparatus (see also IEC Guide 112).

1.1.2 This standard applies to apparatus with a RATED SUPPLY VOLTAGE not exceeding

– 250 V a.c. single phase or d.c. supply;
– 433 V a.c. in the case of apparatus for connection to a supply other than single-phase.

1.1.3 This standard applies to apparatus for use at altitudes not exceeding 2 000 m above sea level, primarily in dry locations and in regions with moderate or tropical climates.

For apparatus with protection against splashing water, additional requirements are given in Annex A.

For apparatus to be connected to TELECOMMUNICATION NETWORKS, additional requirements are given in Annex B.

For apparatus intended to be used in vehicles, ships or aircraft, or at altitudes exceeding 2 000 m above sea level, additional requirements may be necessary.

NOTE 1 See Table A.2 of IEC 60664-1:2007.

NOTE 2 China has special requirement in choosing multiplication factors at altitude above 2 000 m.

Requirements, additional to those specified in this standard, may be necessary for apparatus intended for special conditions of use.

1.1.4 For apparatus designed to be fed from the MAINS, this standard applies to apparatus intended to be connected to a MAINS supply with transient overvoltages not exceeding overvoltage category II according to IEC 60664-1.

For apparatus subject to transient overvoltages exceeding those for overvoltage category II, additional protection may be necessary in the MAINS supply of the apparatus.

1.2 Normative references

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

IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60038:2009, *IEC standard voltages*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-31:2008, *Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60086-4, *Primary batteries – Part 4: Safety of lithium batteries*

IEC 60107-1:1997, *Methods of measurement on receivers for television broadcast transmissions – Part 1: General considerations – Measurements at radio and video frequencies*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*
Amendment 1:2009

IEC 60127 (all parts), *Miniature fuses*

IEC 60127-6, *Miniature fuses. Part 6: Fuse-holders for miniature cartridge fuse-links*

IEC 60167:1964, *Methods of test for the determination of the insulation resistance of solid insulating materials*

IEC 60216 (all parts), *Electrical insulating materials – Thermal endurance properties*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60227-2:1997, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 2: Test methods*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60249-2 (all parts), *Base materials for printed circuits – Part 2: Specifications*

IEC 60268-1:1985, *Sound system equipment – Part 1: General*

IEC 60317-43, *Specifications for particular types of winding wires – Part 43: Aromatic polyimide type wrapped round copper wire, class 240*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60320-1, *Appliance couplers for household and similar general purposes – Part 1: General requirements*

IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60384-1:2008, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 60384-14:2005, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 60417, *Graphical symbols for use on equipment*, available from: <http://www.graphical-symbols.info/equipment>

IEC 60454 (all parts), *Pressure-sensitive adhesive tapes for electrical purposes*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60691:2002, *Thermal links – Requirements and application guide*

IEC 60695-11-5:2004, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-11-10:2013, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60730-1:2010, *Automatic electrical controls for household and similar use – Part 1: General requirements*

IEC 60747-5-5:2007, *Semiconductor devices – Discrete devices – Part 5-5: Optoelectronic devices – Photocouplers*
Amendment 1:2013

IEC 60825-1:2007, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60851-3:2009, *Winding wires – Test methods – Part 3: Mechanical properties*

IEC 60851-5:2008, *Winding wires – Test methods – Part 5: Electrical properties*

IEC 60851-6:2012, *Winding wires – Test methods – Part 6: Thermal properties*

IEC 60906 (all parts), *IEC system of plugs and socket-outlets for household and similar purposes*

IEC 60950-1:2005, *Information technology equipment – Safety – Part 1: General requirements*
Amendment 1:2009
Amendment 2:2013[1]

IEC 60990, *Methods of measurement of touch current and protective conductor current*

[1] A consolidated edition (2.2) exists, that includes IEC 60950-1:2005 and its Amendments 1:2009 and 2:2013.

IEC 60998-2-2, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units*

IEC 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm^2 up to 35 mm^2 (included)*

IEC 60999-2, *Connecting devices – Electrical copper conductors. Safety requirements for screw-type and screwless-type clamping units – Part 2: Particular requirements for clamping units for conductors above 35 mm^2 up to 300 mm^2 (included)*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61051-2:1991, *Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors*
Amendment 1:2009

IEC 61058-1:2000, *Switches for appliances – Part 1: General requirements*

IEC/TS 61149, *Guide for safe handling and operation of mobile radio equipment*

IEC 61260, *Electroacoustics – Octave-band and fractional-octave-band filters*

IEC 61293, *Marking of electrical equipment with ratings related to electrical supply – Safety requirements*

IEC 61558-1:2005, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*
Amendment 1:2009[2]

IEC 61558-2-16, *Safety of power transformers, power supply units and similar products for voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*

IEC 61965, *Mechanical safety of cathode ray tubes*

IEC 62133, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications*

IEC 62151:2000, *Safety of equipment electrically connected to a telecommunication network*

IEC 62368-1, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

IEC Guide 112, *Guide on the safety of multimedia equipment*

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2 A consolidated edition (2.1) exists, that includes IEC 61558-1:2005 and its Amendment 1:2009.

ISO 261, *ISO general purpose metric screw threads – General plan*

ISO 262, *ISO general-purpose metric screw threads – Selected sizes for screws, bolts and nuts*

ISO 306:2004, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality level (AQL) for lot-by-lot inspection*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*, available from: <http://www.graphical-symbols.info/equipment>

ISO 9773, *Plastics – Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source*

ITU-T Recommendation K.44*, Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic recommendation*