BS EN 60065:2014



BSI Standards Publication

Audio, video and similar electronic apparatus — Safety requirements

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National foreword

This British Standard is the UK implementation of EN 60065:2014. It is derived from IEC 60065:2014. It supersedes BS EN 60065:2002+A12:2011, which will be withdrawn on 17 November 2017.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags ▌C〉 〈C▐.

The UK participation in its preparation was entrusted to Technical Committee EPL/108, Safety of electronic equipment within the field of audio/video, information technology and communication technology.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Published by BSI Standards Limited 2015

ISBN 978 0 580 74049 7

ICS 97.020

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2015.

Amendments/corrigenda issued since publication

Date	Text affeced

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60065

December 2014

ICS 97.020

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)

This European Standard was approved by CENELEC on 2014-11-17. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

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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 agreed common modifications.

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.

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.

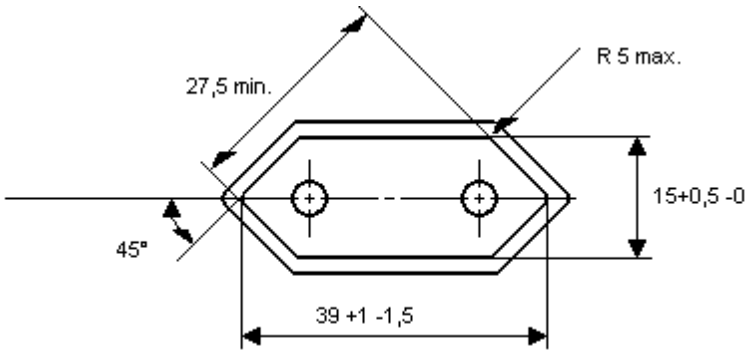
NOTE If it affects harmonization, it forms part of the European Standard.

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

Clause	Special national condition
2.6.1	**Denmark** The following is added: Certain types of Class I apparatus, see 15.1.1, may be provided with a plug not establishing earthing continuity when inserted in Danish socket-outlets *Justification:* Heavy Current Regulations, Section 6c
3.Z1	**Denmark** **Add** to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. *Justification:* In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.
5.4	**Denmark, Finland, Norway and Sweden** To the end of the subclause the following is added: CLASS I apparatus which is intended for connection to the building installation wiring via a plug or an appliance coupler, or both and in addition is intended for connection to other apparatus or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network TERMINALS and ACCESSIBLE parts, have a marking stating that the apparatus must be connected to an earthed MAINS socket-outlet. The marking text in the applicable countries shall be as follows: In **Denmark**: “Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.” In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In **Norway**: “Apparatet må tilkoples jordet stikkontakt” In **Sweden**: “Apparaten skall anslutas till jordat uttag”

Clause	Special national condition
5.5.2	**Norway and Sweden** **Add** to the end of 5.5.2 (after the compliance statement) the following: The screen of the coaxial cable of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation need to be isolated from the screen of a coaxial cable based television distribution system. It is however accepted to provide the insulation external to the apparatus by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the apparatus is intended to be used in: “Apparatus connected to the protective earthing of the building installation through the MAINS connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)” NOTE In Norway, due to regulation for installations of CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.” Translation to Swedish: ”Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”
13.3.1	**Norway** **Add** to the second paragraph the following: Due to the IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230 V in case of a single earth fault. *Justification:* Based on a use in Norway of an IT power distribution system where the neutral is not provided

Clause	Special national condition
	Denmark
15.1.1	To the first paragraph the following is added: In Denmark, supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1. Appliances of Class I provided with socket-outlets with earth contact 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 which assure earth continuity with the socket-outlet in accordance with DS 60884-2-D1. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-1. To the second paragraph the following is added: Socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance with DS 60884-2-D1 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with DS 60884-2-D1 Standard Sheet DKA 1-3a or DKA 1-1c. To the third paragraph the following is added: Mains socket-outlets with earthing contact shall be in compliance with DS 60884-2-D1, Standard sheet DK 1-3a, DK 1-1c, DK 1-1d, DK 1-5a or DK 1-7a *Justification*: Heavy Current Regulations, Section 6c
	Ireland
15.1.1	Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, “13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. *Justification*: SI 525: 1997
	Norway
15.1.1	Mains socket-outlets mounted on Class II apparatus shall comply with the specifications given in CEE Publ. 7 as far as applicable, with the following amendments: § 8 Dimensions a) 2,5 A 250 V two-pole socket-outlets for electronic apparatus shall comply with the enclosed Standard Sheet I.

Clause	Special national condition
15.1.1 continued	**Norway** (continued) STANDARD SHEET I 2,5 A/250 V SOCKET-OUTLET FOR ELECTRONIC APPLIANCES OF CLASS II  Dimensions in mm Other dimensions according to CEE Publication 7 Standard Sheet I "Portable Single-Way Socket-Outlets". § 24 Mechanical strength a) 2,5 A, 250 V socket-outlets for Class II electronic apparatus are tested as specified in EN 60065:2014, 12.1.3. Also the protecting rim shall be tested. *Justification*: Act of 24 May 1929 relating to supervision of electrical installation (TEA 1929/FEL 1998).
15.1.1	**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. *Justification*: SI 1768: 1994

Clause	Special national condition
Annex B	**Finland, Norway and Sweden** All sub clauses given below are sub clauses of IEC 62151 (ref. corrigenda 1 and 2 to IEC 62151). **Subclause 4.1.1 (corrigendum 2):** **Add** after the first paragraph: NOTE In **Finland**, **Norway** and **Sweden**, CLASS I equipment which is intended for connection to the building installation via a non-industrial plug or a non-industrial appliance coupler, or both and in addition is intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and ACCESSIBLE parts, has a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Finland: " Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan " In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag" **Subclause 4.1.4 (corrrigendum 1)** **Add** at the end of the subclause: NOTE In **Norway**, for requirements see 4.1.1, note and 5.3.1, note 1. **Subclause 4.2.1.2 (corrigendum 1)** **Add** at the end of the subclause: NOTE 3 In **Norway**, for requirements see 5.3.1, note 1. **Subclause 4.2.1.3 (corrigendum 2)** **Add** at the end of the subclause: NOTE In **Norway**, for requirements see 4.1.1, note and 5.3.1, note 1. **Subclause 4.2.1.4 (corrigendum 1)** **Number** the existing note as NOTE 1 and **add** at the end of the subclause the following NOTE 2: NOTE 2 In **Norway**, for requirements see 4.1.1, note and 5.3.1, note 1. **Subclause 5.3.1 (corrigendum 1)** **Add** after the first test specifications paragraph: NOTE 1 In **Finland**, **Norway** and **Sweden**, there are additional requirements for the insulation. **Renumber** the existing note as NOTE 2.

Clause	Special national condition
Annex B (continued)	For additional requirements for the insulation in Finland, Norway and Sweden in NOTE 1 the following text is added between the first and the second paragraph (this text is identical to the corresponding EN 60950-1:2001): NOTE 1 In **Finland**, **Norway** and **Sweden**, 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 the accordance with the compliance clause below and in addition: • passes the test and inspection criteria of 13.6 with an electric strength test of 10.3 using the test voltage of 1,5 kV multiplied by 1,6, and • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV (for performance of the test see N.2.1). It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2. A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions: • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in IEC 62151:2000, 6.2.1; • the additional testing shall be performed on all the test specimens as described in EN 132400; • the impulse test of 2,5 kV is to be performed before the endurance test in EN 132400 in the sequence of tests as described in EN 132400. **Subclause 5.3.2 (corrigendum 1)** **Add** after the fourth dash: NOTE In **Finland**, **Norway** and **Sweden**, exclusions are applicable for equipment which is intended for connection to the building installation wiring using screw terminals or other reliable means, and for equipment which is intended for connection to the building installation wiring via an industrial plug and socket -outlet or an appliance coupler, or both, complying with EN 60309 or with a comparable national standard.
J.2	**Norway** After Table J.1 the following is added: Due to the IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230 V in case of a single earth fault. *Justification:* Based on a use in Norway of an IT power distribution system where the neutral is not provided

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 CEN/CENELEC national member.

This European Standard falls under Directive 2006/95/EC.

NOTE (from CEN/CENELEC IR Part 2:2011, 2.17): Where standards fall under EU Directives, it is the view of the Commission of the European Communities (OJ No C 59; 1982-03-09) 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 the free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided for 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.

Clause	National deviation
	Italy
5.1	The following requirements shall be fulfilled: - The power consumption in Watts (W) shall be indicated on TV receivers and in their instruction for use (Measurement according to IEC 60107-1) NOTE EN 60555-2 has since been replaced by IEC 60107-1:1997. - TV receivers shall be provided with an instruction for use, schematic diagrams and adjustments procedure in Italian language. - Marking for controls and terminals shall be in Italian language. Abbreviation and international symbols are allowed provided that they are explained in the instruction for use. - The ECC manufacturers are bound to issue a conformity declaration according to the above requirements in the instruction manual. The correct statement for conformity to be written in the instruction manual, shall be: Questo apparecchio è fabbricato nella CEE nel rispetto delle disposizioni del D.M. marzo 1992 ed è in particolare conforme alle prescrizioni dell'art. 1 dello stesso D.M. - The first importers of TV receivers manufactured outside EEC are bound to submit the TV receivers for previous conformity certification to the Italian Post Ministry (PP.TT). The TV receivers shall have on the backcover the certification number in the following form: D.M. 26/03/1992 xxxxx/xxxxx/S or T or pT S for stereo T for teletext pT for retrofitable teletext *Justification:* Ministerial Decree of 26 March 1992: National rules for television receivers trade. NOTE The ministerial decree above contains additional, but not safety relevant requirements.

Clause	National deviation
6.1	**Germany** The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. *Justification*: German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the Council Directive 96/29/Euratom in Germany. NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de
14.1	**Sweden** The following requirements shall be fulfilled: Switches containing mercury such as thermostats, relays and level controllers are not allowed.

Annex ZD
(informative)

IEC and CENELEC code designations for flexible cords

Table ZD.1 – IEC and CENELEC code designations for flexible cords

Type of flexible cord	Code designations	
	IEC	CENELEC
PVC insulated cords		
Flat twin tinsel cord	60227 IEC 41	H03VH-Y
Light polyvinyl chloride sheathed flexible cord	60227 IEC 52	H03VV-F H03VVH2-F
Ordinary polyvinyl chloride sheathed flexible cord	60277 IEC 53	H05VV-F H05VVH2-F
Rubber insulated cords		
Braided cord	60245 IEC 51	H03RT-F
Ordinary tough rubber sheathed flexible cord	60245 IEC 53	H05RR-F
Ordinary polychloroprene sheathed flexible cord	60245 IEC 57	H05RN-F
Heavy polychloroprene sheathed flexible cord	60245 IEC 66	H07RN-F
Cords having high flexibility		
Rubber insulated and sheathed cord	60245 IEC 86	H03RR-H
Rubber insulated, crosslinked PVC sheathed cord	60245 IEC 87	H03RV4-H
Crosslinked PVC insulated and sheathed cord	60245 IEC 88	H03V4V4-H

Annex ZE
(informative)

Significance of $L_{Aeq,T}$ in EN 50332-1 and additional information

$L_{Aeq,T}$ is derived from the general formula for equivalent sound pressure:

$$L_{eq} = 10\log\left[\frac{1}{t_2 - t_1}\int_{t_1}^{t_2}\frac{p_A^2}{p_0^2}dt\right]$$

This is represented graphically in Figure ZE.1:

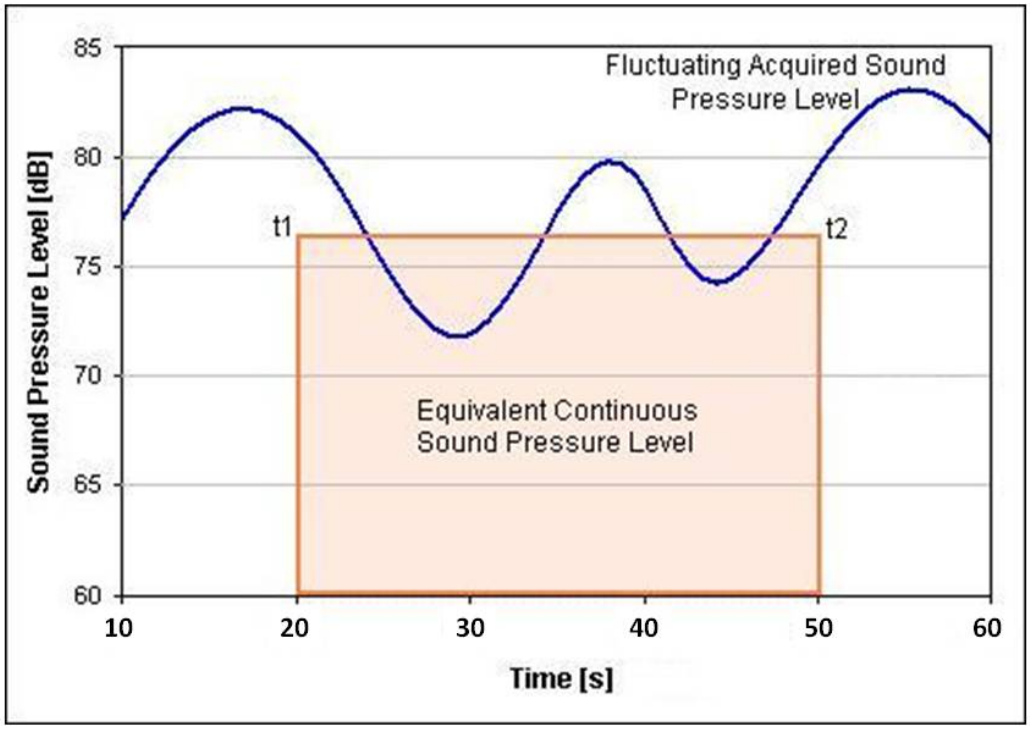


Figure ZE.1

In EN 50332-1, the measurement time interval ($t_2 - t_1$) is 30 s.

In practice, and for the purposes of listening to personal music player content, $L_{Aeq,T}$ has a time interval T ($t_2 - t_1$) in the order of minutes / hours and not seconds.

6.5 (Limitation value) of EN 50332-1:2000 acknowledges this fact and states that the 100 dB limit equates to a long time average of 90 dB $L_{Aeq,T}$. By using the HD 483.1 “programme simulation noise” test signal, this also takes the spectral content into account.

The SCENHIR [5)] report states that 80 dB(A) is considered safe for an exposure time of 40 h/week. Most persons do not listen to 40 h/week to their personal music player. In addition, not all music tracks are at the same level of the simulated noise signal. Whilst modern music tends to be at around the same level, most of the available music is at a lower average level. Therefore, the working group [6)] considers a value of 85 dB(A) to be safe for an overwhelming majority of the users of personal music players.

5) SCENIHR opinion of 23 Sept 2008: Potential health risks of exposure to noise from personal music players and mobile phones including a music playing function.

6) CLC/TC 108X/WG 03.

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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;