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PUBLICATION GROUPÉE DE SÉCURITÉ

AMENDMENT 2
AMENDEMENT 2

Audio, video and similar electronic apparatus – Safety requirements

Appareils audio, vidéo et appareils électroniques analogues – Exigences de sécurité

IEC 60065:2001/A2:2010

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Audio, video and similar electronic apparatus – Safety requirements

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FOREWORD

This amendment has been prepared by IEC technical committee 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology.

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

FDIS	Report on voting
108/395/FDIS	108/414/RVD

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

The committee has decided that the contents of this amendment and the base publication 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- withdrawn,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

Electric shock

In the last sentence of the first paragraph, change "parts which may be touched" *to* "parts that may be touched".

In the first sentence of the second paragraph, change "caused by a fault" *to* "caused by a single fault".

In the third sentence of the second paragraph, change "supplementary insulation" *to* "SUPPLEMENTARY INSULATION" *and* "basic insulation" *to* "BASIC INSULATION".

Fire

Replace the existing text under this title by the following:

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.

Replace throughout the document IEC 60707 by IEC 60695-11-10.

Replace throughout the document IEC 60695-2-2 by IEC 60695-11-5.

*Replace throughout the document "*OPERATING VOLTAGE*" by "*WORKING VOLTAGE*".*

1 General

1.1 Scope

Subclause 1.1.1

Delete the existing Note 2.

Replace the existing Note 3 by the following:

NOTE 2 Video games, flipper games and gaming machines and other amusement games for commercial use are covered by IEC 60335-2-82 [6].

Renumber existing Note 4 as Note 3.

1.2 Normative references

Add, to the existing list, the following new references:

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

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

Replace the reference to IEC 60695-11-10 by the following new reference:

IEC 60695-11-10:1999, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*
Amendment 1 (2003)[1)]

Replace the reference to IEC 60695-2-2 by the following new reference:

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

Replace the reference to IEC 60825-1 by the following new reference:

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

Delete the following references:

IEC 60695-2-2:1991, *Fire hazard testing – Part 2: Test methods – Section 2: Needle-flame test*

IEC 60707:1999, *Flammability of solid non-metallic materials when exposed to flame sources – List of test methods*

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1) A consolidated edition (1.1) exists, including IEC 60695-11-10:1999 and its Amendment 1.

2 Definitions

2.2.6
LASER SYSTEM

Replace the reference between brackets by the following:

see 3.48 of IEC 60825-1:2007

2.2.7
LASER

Replace the reference between brackets by the following:

see 3.41 of IEC 60825-1:2007

2.2.10
PORTABLE APPARATUS

Replace the existing definition by the following:

PORTABLE APPARATUS
apparatus specifically designed to be carried easily, the mass of which does not exceed 18 kg

2.3.2
OPERATING VOLTAGE

Replace the existing term and definition by the following:

WORKING VOLTAGE
highest voltage, non-repetitive transients being disregarded, to which the insulation under consideration is or can be subjected when the apparatus is operating at its RATED SUPPLY VOLTAGE under normal operating conditions

2.6.3
BASIC INSULATION

Replace the existing note by the following:

NOTE BASIC INSULATION may also serve as functional insulation.

Add, after definition 2.8.11, the following new definition:

2.8.12
PASSIVE FLAMMABILITY
flammability caused by external heating of the component (for example, by flames)

4 General test conditions

4.3 Fault conditions

Replace the existing Note 2 by the following:

NOTE 2 Examination of the apparatus and all its circuit diagrams, excluding the internal circuit diagrams of integrated circuits, generally shows the fault conditions that are likely to create a hazard and that need to be applied. These are applied in sequence, in the order that is most convenient.

The examination of the apparatus and circuit diagrams indicate the operating conditions under which simulated faults should be applied in order to produce the most unfavourable effects. In most cases, the effects of a simulated fault are most unfavourable if the simulated fault is applied while the apparatus is in full operation.

However, for some parts, the most unfavourable effects may occur if the simulated fault is applied before switching on the apparatus. It is also possible that the most unfavourable effects could occur when a simulated fault is applied when the apparatus is in a STAND-BY condition.

5 Marking and instructions

Add the following after the third compliance paragraph:

As an alternative, it is permitted to use a reagent grade hexane with a minimum of 85 % as n-hexane.

NOTE The designation “n-hexane” is chemical nomenclature for a "normal" or straight chain hydrocarbon. This petroleum spirit may further be identified as a certified ACS (American Chemical Society) reagent grade hexane (CAS# 110-54-3).

5.1 Identification and supply ratings

Replace item h) by the following:

h) RATED CURRENT CONSUMPTION or RATED POWER CONSUMPTION for apparatus intended for connection to an a.c. MAINS supply.

The measured consumption at RATED SUPPLY VOLTAGE shall not exceed the marked value by more than 10 %.

For RATED CURRENT CONSUMPTION or RATED POWER CONSUMPTION measurements of television sets, the following settings shall apply:

– the ‘three vertical bar signal’ shall be used as defined in 3.2.1.3 of IEC 60107-1:1997; and

– user ACCESSIBLE picture controls shall be adjusted so as to obtain the maximum power consumption; and

– sound settings shall be as defined in 4.2.4 a) of this standard.

Delete item i).

5.2 TERMINALS

Replace the first paragraph of item c) by the following:

Unless the TERMINALS are marked with the type references of the apparatus that are permitted to be connected, output TERMINALS provided for supply of other apparatus except MAINS supply shall be marked with

– the nominal output voltage; and

– the maximum output current or power, if with the most unfavourable load, temperature rises higher than those allowed in Table 3 for normal operating conditions can occur.

Subclause 5.3

Add the following new title to Subclause 5.3 as well as the following new text before the existing text:

5.3 Caution marking

The following markings shall be included as applicable:

Rename the first paragraph of the existing text of this subclause as item a).

Add the following new item b) to 5.3 before the existing compliance statement:

b) Where a loudspeaker grille, removable from the outside by the use of a tool, coin or other object, is relied on as protective cover (see 9.2), the following marking, or equivalent, shall be visible on the enclosure after removal of the grille:

CAUTION
To prevent electric shock hazard, do not connect to mains power supply while grille is removed.

Alternatively, the symbol ϟ, IEC 60417-5036 (2002) shall be visible after removal of the grille and the caution wording above shall appear in the user instructions, accompanied by the symbol.

Add the following new note after the existing compliance statement:

NOTE In Finland, Norway and Sweden, 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.

5.4 Instructions

Subclause 5.4.1

Add the following new notes after the existing text:

NOTE In Norway and Sweden, 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 needs to be isolated from the screen of a coaxial cable based television distribution system.

It is, however, acceptable 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:

“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 therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)”.

In Norway, due to regulation for 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): “Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet.”

Translation to Swedish: ”Apparater som är kopplade 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 apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.”

6 Hazardous radiations

6.2 Laser radiation

*Replace in the fifth paragraph the reference "*IEC 60825-1, 3.32 b)*" by "*IEC 60825-1:2007, 3.37 b)*".*

Subclause 6.2.1

Replace in the second paragraph of item a) the reference "IEC 60825-1, 8.2" by "IEC 60825-1:2007, 9.2".

7 Heating under normal operating conditions

7.1.5 Parts not subject to a limit under 7.1.1 to 7.1.4 inclusive

*Add in Table 3 the reference to footnote [a] to the column heading of both items "*Normal operating conditions*" and "*Fault conditions*".*

9 Electric shock hazard under normal operating conditions

9.1 Testing on the outside

9.1.1 General

*Add the following new paragraph before the paragraph starting with "*The requirements to determine whether*…":*

For PROFESSIONAL EQUIPMENT, audio output TERMINALS are permitted to be ACCESSIBLE to SKILLED PERSONS if the audio output voltage, when the apparatus is producing its NON-CLIPPED OUTPUT POWER, is not greater than 120 V r.m.s.

9.1.6 Withdrawal of MAINS plug

Add the following new paragraph at the end of the subclause:

When conducting the measurement, the measurement is either made with or referred to an instrument having an input impedance consisting of a resistance of 100 MΩ ± 5 MΩ in parallel with an input capacitance of 25 pF or less.

9.2 Removal of protective covers

Add the following new paragraphs after the second paragraph:

This requirement applies also to internal parts of loudspeaker systems that become ACCESSIBLE by the removal of a loudspeaker grille from the outside by the use of a tool, coin or other object.

In such a case, the apparatus shall be marked according to 5.3 b).

Replace the existing compliance statement by the following:

Compliance is checked by inspection and by application of the tests of 9.1.1, except that the measurements are made 2 s after removal of the cover or grille.

11 Fault conditions

11.2 Heating

11.2.1 Measurement of temperature rises

Replace the second paragraph by the following:

During this period, the apparatus shall meet the requirements of 11.2.2 up to and including 11.2.7.

11.2.3 Parts, other than windings, providing electrical insulation

Replace the existing title and text of this subclause by the following:

11.2.3 Parts, other than windings and PRINTED BOARDS, providing electrical insulation

The temperature rise of insulating parts other than windings and PRINTED BOARDS, the failure of which would cause an infringement of the requirements of 11.1, 11.2.2 and 11.2.4, shall not exceed the values given in Table 3, item b) "Fault conditions".

If a temperature rise limit is exceeded, and if there is doubt as to whether or not an electric shock hazard exists, a short circuit is applied between the conductive parts concerned and the tests of 11.1 are repeated.

11.2.6 Parts not subject to a limit under 11.2.1 to 11.2.5 inclusive

Replace the title and the text of this subclause by the following:

11.2.6 PRINTED BOARDS

Where a failure would cause an infringement of the requirements of 11.1, 11.2.2 and 11.2.4, the temperature rise on a PRINTED BOARD shall not exceed the values given under "Fault conditions" in Table 3, item b), with the following exceptions.

The temperature rise may exceed the above values by not more than 100 K for a maximum period of 5 min.

For PRINTED BOARDS classified as V-0 according to IEC 60695-11-10 or Clause G.1, the temperature rise may exceed:

a) the values given under "Fault conditions" in Table 3, item b), by not more than 100 K on one or more small areas providing that the total area does not exceed 2 cm^2 for each fault condition and no electric shock hazard is involved; or

b) for a maximum period of 5 min, the values given under "Fault conditions" in Table 3, item b), up to the temperature rise value given for "other parts" under "Fault conditions" in Table 3, item e), on one or more small areas, providing that the total area does not exceed 2 cm^2 for each fault condition and no electric shock hazard is involved.

If a temperature rise limit is exceeded and if there is doubt as to whether or not an electric shock hazard exists, a short circuit is applied between the conductive parts concerned and the tests of 11.1 are repeated.

If conductors on PRINTED BOARDS are interrupted, peeled or loosened during any test, the apparatus is still deemed to be satisfactory if all of the following conditions are met:

– *the PRINTED BOARD is classified as V-0 according to IEC 60695-11-10 or Clause G.1;*

– *the interruption is not a POTENTIAL IGNITION SOURCE;*

– *the apparatus complies with the requirements of this subclause with the interrupted conductors bridged;*

– *any peeled or loosened conductor does not reduce the CLEARANCES and CREEPAGE DISTANCES between HAZARDOUS LIVE parts and ACCESSIBLE parts below the values specified in Clause 13.*

For CLASS I apparatus, the continuity of any protective earthing connection shall be maintained; loosening or peeling off of such a conductor is not allowed.

Add, after Subclause 11.2.6, the following new subclause:

11.2.7 Parts not subject to a limit under 11.2.1 to 11.2.6 inclusive

According to the nature of the material, the temperature rise of the part shall not exceed the values given under “Fault conditions” in Table 3, item e).