IEC/TS 62441

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

colour inside

Safeguards against accidentally caused candle flame ignition for audio/video, communication and information technology equipment

Mesures de protection contre l'embrasement accidentel dû à une flamme de bougie dans les équipements audio/video, des technologies de la communication et de l'information

IEC/TS 62441:2011

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SAFEGUARDS AGAINST ACCIDENTALLY CAUSED CANDLE FLAME IGNITION FOR AUDIO/VIDEO, COMMUNICATION AND INFORMATION TECHNOLOGY EQUIPMENT

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62441, which is a technical specification, has been prepared by IEC technical committee 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology.

This second edition of IEC 62441 cancels and replaces the first edition published in 2006 and constitutes a technical revision. This edition includes the following technical changes with respect to the previous edition:

– acceptance of wood with a minimum thickness as equivalent to V-1;
– interpretation information regarding vertical surfaces.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
108/391/DTS	108/412/RVC

Full information on the voting for the approval of this technical specification 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.

The following print types are used:

– requirements proper and normative annexes: in roman type;
– *compliance statements and test specifications: in italic type;*
– notes/explanatory matter: in small roman type;
– terms that are defined in Clause 3: **bold.**

The committee has decided that the contents of this 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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The first version of this technical specification was discussed at the TC108 plenary meeting in Matsue, Japan in October 2008. It was decided to extend the TS for another three year period and to implement some changes as previously agreed in several TC108 meetings. The text of this technical specification is based on the outcome of these discussions.

In line with SMB decision 135/20 and document AC/22/2009, it is anticipated that the next step for this document would be a proposal for publication as an International Standard, taking into account any further developments regarding the improvement of these requirements.

It should be noted that the Fire Team of the HBSDT (Hazard based standard development team) developed requirements on a Heat Release Rate Performance Test and recommended a peak Heat Release Rate (pHRR) value of 50 KW for equipment covered by the standard. It also generated test data for the specific pre-selection criteria for equipment, such as keyboards, that have fuels that are predominantly horizontal in their construction. Development testing that had been conducted included assessment of products that were difficult to ignite with a candle and that passed preliminary pHRR testing with significant margin. However, these products commonly use fuels that may not pass

1) the flammability rating,
2) the material weight exemption, or
3) the sustained ignition testing.

These additional requirements and test methods did not give the same level of reproducibility that would be desired for inclusion as normative requirements in a standard, and are therefore not currently included in this technical specification. It should be noted that additional work is being undertaken to improve on the pHRR test procedure so that better reproducibility can be attained.

SAFEGUARDS AGAINST ACCIDENTALLY CAUSED CANDLE FLAME IGNITION FOR AUDIO/VIDEO, COMMUNICATION AND INFORMATION TECHNOLOGY EQUIPMENT

1 Scope

This technical specification introduces safeguards to reduce the likelihood of room flash-over as a result of accidental ignition of exterior housings of audio/video and information communication technology products likely to be used in the home, caused by a candle flame.

NOTE According to AC/22/2009 and SMB decision 135/20, this technical specification should currently only be used for television sets. It can be used for other products only if a risk assessment indicates problems with these products.

2 Normative references

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

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

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

IEC 60695-11-20, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test methods*

3 Terms and definitions

3.1
combustible material
organic material, capable of combustion by a candle flame

NOTE 1 Metal or ceramic are examples of materials that are not combustible by a candle flame.

NOTE 2 All plastic materials are considered combustible by a candle flame, regardless of flammability classification.

3.2
flammability classification of materials
classification of the burning and extinguishing behaviour of a material

NOTE 1 Material classes are defined in 3.2.1 to 3.2.4. Where a certain class of material is required, a material with a better classification is always acceptable.

NOTE 2 When applying the requirements in this technical specification, a material of **5VA class material** is regarded as better than **5VB class material**, **5VB class material** better than **V-0 class material** and **V-0 class material** better than **V-1 class material** (see 5.1).

NOTE 3 When applying the requirements in this technical specification, **V-2 class material** or HB class material is considered less than **V-1 class material** (see 5.1). For further details regarding these flame classifications, see IEC 60695-11-10.

3.2.1
V-0 class material
material tested in the thinnest significant thickness used and classified **V-0** according to IEC 60695-11-10

3.2.2
V-1 class material
material tested in the thinnest significant thickness used and classified **V-1** according to IEC 60695-11-10

3.2.3
5VA class material
material tested in the thinnest significant thickness used and classified **5VA** according to IEC 60695-11-20

3.2.4
5VB class material
material tested in the thinnest significant thickness used and classified **5VB** according to IEC 60695-11-20

3.3
individual item
equipment or a part of the equipment, with its own exterior housing, that is not required to be in physical contact with another equipment or part of the other equipment for its normal operation

NOTE An **individual item** may be electrically connected to other equipment and may or may not contain its own power source. Examples include keyboards, display units, speakers, etc.

3.4
candle flame accessible area
an area of **combustible material** on the exterior surface of an **individual item** to which the simulated candle flame is applied

NOTE See 5.2 for the criteria.

4 Warning for users

If the **individual item** has an outer housing having a mass of more than 300 g of **combustible material**, of which at least part is within a **candle flame accessible area**, users shall be informed about the risks associated with the burning of candles in the user instructions, available with the equipment, or on a warning label on the equipment.

If a symbol is used, it shall be in accordance with the example shown below (currently IEC 60417-Pr10-040) and it shall have a minimum height of 10 mm.

NOTE The colours of ISO 3864 do not apply to the symbol.

If text is used, it shall have the following or similar wording, with a minimum letter height of 3 mm:

WARNING

To prevent the spread of fire, keep candles or other open flames away from this product at all times.

Compliance is checked by inspection.

5 Control of fire growth

5.1 General

An **individual item**, if accidentally subjected to a candle flame, shall reduce the likelihood of spread of fire to adjacent items by limiting the fire growth.

An **individual item** having a **candle flame accessible area** is considered to comply if it meets the requirements of either a), b), or c) below:

a) the total mass of the **combustible materials** located at the outer surface does not exceed 300 g; or

b) the **combustible material** used in **candle flame accessible areas** is made of **V-1 class material**; or

NOTE 1 Application of the test flame in a horizontal position (see Figure 2) results in a portion of the flame extending above the centre-line application point, which makes it necessary to consider the areas immediately above the centre-line with respect to their flame class properties or their combustibility [see also 5.1c) below].

c) the **combustible materials** used in **candle flame accessible areas** do not exhibit flaming for more than 3 min as determined by the test of 5.4.

Individual parts

– located in a **candle flame accessible area**, and

– made of **combustible material** rated less than V-1 class material

are exempt from b) and c) above provided that

– the mass of **combustible material** rated less than **V-1 class material** of each individual part does not exceed 25 g, and

– the total mass for all such individual parts does not exceed 10 % of the total mass of the **combustible material**, with a limit of 300 g, located at the exterior surface of the **individual item**.

NOTE 2 Examples of such individual parts are knobs, switches, covers, and dial faces.

When determining the 300 g mass of the exterior enclosure or the mass of the individual part, only the mass between the outermost surface and a plane that is in line with the inner surface of the exterior enclosure needs to be taken into account.

Wood and wood-based material with a thickness of at least 6 mm is considered to fulfill the **V-1 class material** requirement.

NOTE 3 It is recommended that the quantity of environmentally unfriendly flame retardant materials should be kept as low as possible.

Compliance is checked by inspection, measurement and, if necessary, by the test of 5.4.

5.2 Determination of candle flame accessible areas

Candle flame accessible areas are considered to be the following exterior surfaces of an **individual item**:

– surfaces that are vertical to or overhanging the supporting surface and are located between 10 mm and 150 mm directly above the supporting surface (see Figures 1a and 1b); and

– the bottom of the **individual item**, unless it rests directly on the supporting surface or is within 10 mm of the supporting surface in its normal position of use.

NOTE 1 The term vertical does not mean a perfectly vertical position. It should be interpreted as any surface that can be touched by the flame of a candle of 150 mm height and 20 mm diameter while the candle is still touching the supporting surface. A typical candle used in the home is assumed to be 20 mm diameter.

When determining the **candle flame accessible areas**, doors, drawers and user removable parts are closed or placed in the intended positions.

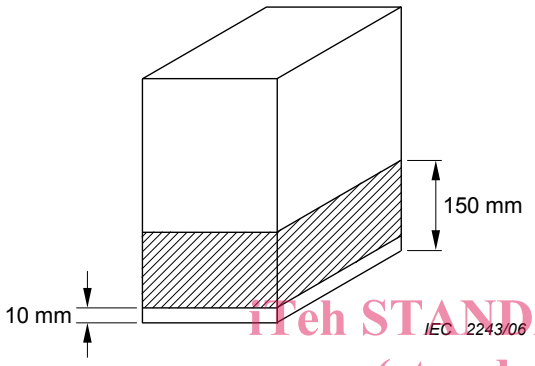

Figure 1a – Equipment illustrating straight vertical sides

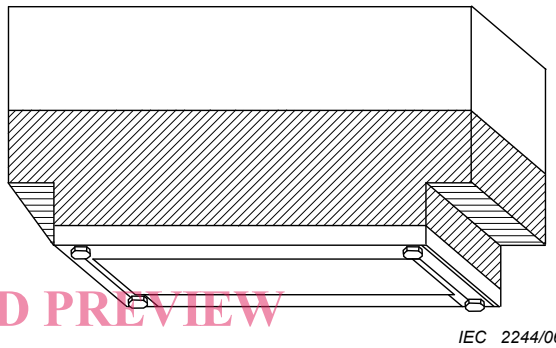

Figure 1b – Equipment illustrating a raised or stepped portion

Figure 1 – Examples of candle flame accessible areas

NOTE 2 The identified cross-hatched areas give the general principle for the application areas of the test flame. A practical approach should be used to determine the **candle flame accessible areas**. In general, top surfaces of equipment are not considered, however, vertical surfaces having a height of greater than 10 mm that are adjacent to large horizontal surfaces of the **individual item** itself, such as a raised or stepped portion of an external enclosure, may also need to be considered.

5.3 Test methodology

5.3.1 Conditioning

*The **individual item** is conditioned for a minimum of 24 h at 23 °C ± 2 °C and 50 % ± 5 % relative humidity. Once removed from the conditioning chamber, the **individual item** is tested within 1 h. The **individual item** shall be tested in a laboratory atmosphere of 15 °C to 35 °C and 45 % to 75 % relative humidity.*

5.3.2 Positioning the individual item

***Individual items** are tested separately.*

*The **individual item** is not energized during the test.*

*The **individual item** is tested without consumable materials and media.*

*The **individual item** is placed on a smooth, flat non-combustible supporting surface. The supporting surface shall be of sufficient size to accept the placement of the **individual item** within the boundaries of the surface and to accept any potential collapse of the **individual item** during the test. The supporting surface shall be a single piece of material without any joints.*