

# INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –  
Part 2-82: Particular requirements for amusement machines and personal  
service machines**

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# INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –  
Part 2-82: Particular requirements for amusement machines and personal  
service machines**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

|   |    |
|---|----|
| FOREWORD .....  | 4  |
| INTRODUCTION .....  | 7  |
| 1 Scope .....   | 8  |
| 2 Normative references .....  | 9  |
| 3 Terms and definitions .....   | 9  |
| 4 General requirement .....   | 11 |
| 5 General conditions for the tests .....  | 11 |
| 6 Classification .....  | 12 |
| 7 Marking and instructions .....  | 12 |
| 8 Protection against access to live parts .....   | 13 |
| 9 Starting of motor-operated appliances .....   | 14 |
| 10 Power input and current .....  | 14 |
| 11 Heating .....  | 14 |
| 12 <del>Void</del> Charging of metal-ion batteries .....  | 15 |
| 13 Leakage current and electric strength at operating temperature .....   | 15 |
| 14 Transient overvoltages .....   | 15 |
| 15 Moisture resistance .....  | 15 |
| 16 Leakage current and electric strength .....  | 16 |
| 17 Overload protection of transformers and associated circuits .....  | 16 |
| 18 Endurance .....  | 16 |
| 19 Abnormal operation .....   | 16 |
| 20 Stability and mechanical hazards .....   | 18 |
| 21 Mechanical strength .....  | 19 |
| 22 Construction .....   | 19 |
| 23 Internal wiring .....  | 20 |
| 24 Components .....   | 21 |
| 25 Supply connection and external flexible cords .....  | 21 |
| 26 Terminals for external conductors .....  | 22 |
| 27 Provision for earthing .....   | 22 |
| 28 Screws and connections .....   | 22 |
| 29 Clearances, creepage distances and solid insulation .....  | 22 |
| 30 Resistance to heat and fire .....  | 23 |
| 31 Resistance to rusting .....  | 23 |
| 32 Radiation, toxicity and similar hazards .....  | 23 |
| Annexes .....   | 25 |
| Annex B (normative) Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances ..... | 26 |
| Annex R (normative) Software evaluation .....   | 27 |
| Bibliography .....  | 28 |
| List of comments .....  | 29 |
| Figure 101 – Probe for measuring surface temperatures .....   | 24 |

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions ..... 15

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-82: Particular requirements for amusement machines and personal service machines

#### FOREWORD

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**This commented version (CMV) of the official standard IEC 60335-2-82:2024 edition 4.0 allows the user to identify the changes made to the previous IEC 60335-2-82:2017+AMD1:2020 CSV edition 3.1. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.**

**A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.**

**This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.**

IEC 60335-2-82 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2017 and Amendment 1:2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, 19.2, 19.101, 22.104);
- c) introduction of test probe 18 (22.101);
- d) introduction of test probe 19 (8.1.1, 20.2);
- e) addition of surface temperature rise limits (11.3, 11.8, Table 101).

The text of this International Standard is based on the following documents:

| Draft        | Report on voting |
|--------------|------------------|
| 61/7273/FDIS | 61/7299/RVD      |

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for amusement machines and personal service machines.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*

– notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

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## INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules ~~may~~ can differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 ~~Horizontal and generic standards~~ Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. ~~For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.~~ **1**

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters. **2**

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 2-82: Particular requirements for amusement machines and personal service machines

#### 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric commercial amusement machines and personal service machines, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances, including direct current (DC) supplied appliances and **battery-operated appliances**. **3**

~~NOTE 101~~—Examples of appliances that are within the scope of this standard are

- amusement machines:
  - billiard tables;
  - bowling machines;
  - dartboards;
  - driving simulators;
  - gaming machines;
  - **kiddie rides**;
  - laser shooting appliances;
  - pinball machines;
  - video games;
- personal service machines:
  - card re-value machines;
  - currency dispensers;
  - luggage lockers;
  - weighing machines;
  - shoe shining appliances.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by users and **maintenance persons**.

~~NOTE 102~~—Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements ~~may~~ can be necessary;
- in many countries, additional requirements are specified by the national authorities responsible for health, for the protection of labour and similar authorities.

~~NOTE 103~~—This standard does not apply to

- appliances intended exclusively for household use;
- appliances intended exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- appliances for washing cars;
- dispensing appliances and vending machines (IEC 60335-2-75);
- appliances within the scope of ~~IEC 60065~~ IEC 62368-1, such as jukeboxes, household video games, copying machines, ticket machines and automatic teller machines
- ~~appliances within the scope of IEC 60950-1, such as copying machines, ticket machines and automatic teller machines;~~
- appliances intended to be used when a trained attendant is present, such as virtual reality systems;
- equipment intended exclusively for fairgrounds, such as carousels;
- self-balancing personal transport devices (IEC 60335-2-114).

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60065:2001<sup>1</sup>, *Audio, video and similar electronic apparatus – Safety requirements*  
IEC 60065:2001/AMD1:2005  
IEC 60065:2001/AMD2:2010

IEC 60068-2-52:~~1996~~, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

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

## 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

### 3.1 Definitions relating to physical characteristics

#### 3.1.9 ~~Replacement~~ *Modification:* **4** normal operation

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

The appliance is operated in the ~~stand-by~~ **ready mode** until steady conditions are established and then under the most unfavourable conditions of normal use.

The appliance is refilled when necessary in accordance with the instructions for use, or the **instructions for maintenance**, and the next operating period started as soon as possible.

<sup>1</sup> There exists a consolidated edition 7.2 (2010) that includes edition 7 and its Amendment 1 and Amendment 2. This publication has been withdrawn.

Appliances that support persons in normal use are loaded as follows:

- **kiddie rides**, 50 kg for each riding position;
- other appliances, 100 kg for the first riding position and 75 kg for each additional riding position.

Note 1 to entry: The riding position ~~may~~ can be for a sitting or standing person.

If the instructions state that higher loads are allowed, the appliance is loaded accordingly.

Audio amplifiers are operated in accordance with the normal operating conditions specified in ~~IEC 60065~~ IEC 62368-1.

### 3.5 Definitions relating to types of appliances

#### 3.5.101

##### **kiddie ride**

moving appliance having a stationary base for use by one or two children between the ages of three and ten years, under the supervision of an adult

### 3.6 Definitions relating to parts of appliances

#### 3.6.2 *Replacement:*

##### **detachable part**

part that can be removed without the aid of a **tool**, part that is removed in accordance with the instructions for use or **instructions for maintenance**, even if a **tool** or **access key** is ~~needed~~ **necessary** for removal, or part that does not fulfil the test of 22.11

Note 1 to entry: If a part has to be removed for installation purposes, this part is not considered to be detachable even if the instructions state that it is to be removed.

Note 2 to entry: A part that can be opened is considered to be a part that can be removed.

#### 3.6.101

##### **access key**

key or other means that gives access to the **maintenance area** but does not give access to the **service area**

Note 1 to entry: "Other means" includes a **tool** or operation by codes or signals produced by optical or electromagnetic sources.

#### 3.6.102

##### **override key**

key or other means that is used to render an interlock inoperative

#### 3.6.103

##### **user area**

area where access is gained without the use of an **access key** or a **tool**

#### 3.6.104

##### **maintenance area**

area where access can only be gained by the use of an **access key**

#### 3.6.105

##### **service area**

area where access cannot be gained by the use of an **access key** alone

### 3.7 Definitions relating to safety components

#### 3.7.3 Replacement:

##### **thermal cut-out**

device that during abnormal operation limits the temperature of the controlled part by automatically opening the circuit, or reducing the current, and constructed so that its setting cannot be altered by the user or the **maintenance person**

### 3.8 Definitions relating to miscellaneous matters

#### 3.8.5 Replacement:

##### **maintenance operation**

operation that the user or **maintenance person** is intended to perform as stated in the instructions for use, or the **instructions for maintenance**, or as marked on the appliance

Note 1 to entry: The **instructions for maintenance** marked on the appliance, or supplied with the appliance or subsequently, are applicable only to the **user area** and the **maintenance area**.

Note 2 to entry: **Maintenance operation** includes preparing and commissioning the appliance for new operating methods. It does not include operations that are to be performed in the **service area**.

#### 3.8.101

##### **instructions for maintenance**

instructions explaining how to carry out cleaning, replenishing, coin collecting, setting of controls and similar operations

#### 3.8.102

##### **maintenance person**

person who maintains the appliance in accordance with the **instructions for maintenance**

#### 3.8.103

##### **stand-by ready mode** 5

mode of the appliance when it is energized and ready for use, while filled as intended but with empty cash boxes

## 4 General requirement

This clause of Part 1 is applicable.

## 5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

#### 5.6 Replacement:

*Controls or switching devices in the **user area** are adjusted to the most unfavourable setting.*

*Controls, switching devices or other parts in the **maintenance area** are adjusted to the most unfavourable setting within the limits stated in the **instructions for maintenance**; however, controls or switching devices in the **service area** are not adjusted.*

#### 5.9 Addition:

*When alternative software is made available by the appliance manufacturer, the appliance is tested with the software that gives the most unfavourable results.*

**5.101** The requirements of this standard for the **maintenance area** are applicable when the **instructions for maintenance** are being followed. If an **override key** is provided for access to the **maintenance area**, it is used before a test is carried out if this is more unfavourable.

~~5.102 When reference is made to the application of test probe B, test probe 18 of IEC 61032 is also applied in the user area.~~ **6**

~~5.103~~**5.102** Appliances incorporating transformers, **electronic circuits** and lamps are tested as **motor-operated appliances** unless they incorporate a heating element, in which case they are tested as **combined appliances**.

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Modification:

Replace the first paragraph with the following:

Appliances shall be **class I**, **class II** or **class III**.

### 6.2 Addition:

Appliances intended for outdoor use shall be at least IPX4.

Appliances that ~~may~~ are intended to be cleaned by water jets or installed where water jets are liable to be used shall be at least IPX5.

Appliances that use water jets in normal use shall be at least IPX5 unless the water jet cannot be directed at the enclosure of electrical parts, in which case it may be IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

For appliances incorporating a socket outlet, the voltage, nature of the supply and current or power output shall be marked in the vicinity of the socket outlet.

### 7.3 Addition:

The requirement also applies when the adjustment has to be made by the **maintenance person**.

### 7.12 Modification:

The instructions concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance are not applicable.

#### 7.12.1 Addition:

The installation instructions shall state if the appliance is suitable for outdoor use.

For appliances that are not at least IPX5, the instructions shall state that the appliance is not suitable for installation in an area where a water jet could be used.

The installation instructions for moving ride appliances shall state the free space necessary around the appliance for safe operation.

The installation instructions for **kiddie rides** shall state that the installation of a residual current device (RCD) having a rated residual operating current not exceeding 30 mA is advisable.

**7.12.101** If it is necessary to take special precautions during **maintenance operations**, details of these shall be supplied. The **instructions for maintenance** shall state how to gain access to the **maintenance area**. They shall not include instructions on how to gain access to a **service area**.

*Compliance is checked by inspection.*

**7.12.101.1** The **instructions for maintenance** for appliances incorporating an appliance inlet and intended to be partially or completely immersed in water for cleaning shall state that the connector must be removed before the appliance is cleaned and that the appliance inlet must be dried before the appliance is used again.

If the appliance is not at least IPX5, the **instructions for maintenance** shall state that the appliance must not be cleaned by a water jet.

*Compliance is checked by inspection.*

**7.12.101.2** If the use of an **override key** allows access to moving parts, a suitable warning shall be given in the **instructions for maintenance**.

*Compliance is checked by inspection.*

**7.12.101.3** The **instructions for maintenance** shall list any accessories that may be used with the appliance.

*Compliance is checked by inspection.*

**7.12.101.4** For appliances using water, the **instructions for maintenance** shall give details on how to prevent freezing-up or how to ensure safe operation if freezing-up occurs.

*Compliance is checked by inspection.*

## **8 Protection against access to live parts**

This clause of Part 1 is applicable except as follows.

### **8.1.1 Addition:**

*For parts of appliances situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **7***

*Probes 18 and 19 are applied only to surfaces in the **user area**. **8***

**8.1.3** *Addition:*

*Test probe 19 is not applied.*

## 9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

## 10 Power input and current

This clause of Part 1 is applicable.

## 11 Heating

This clause of Part 1 is applicable except as follows.

**11.2** *Modification Addition:*

*Appliances ~~normally~~ intended to be fixed to the floor, and those having a mass greater than 40 kg and not provided with casters or rollers, are installed in accordance with the instructions. If no instructions are provided, the appliance is placed on the floor as close to the walls as possible.*

*Other appliances, except **fixed appliances**, are placed on the floor as near to the walls as possible.*

**11.3** *Addition:*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 101 is used to measure the temperature rises of external **accessible surfaces** in the **user area** or **maintenance area** specified in Table 101. The probe is applied with a force of  $4\text{ N} \pm 1\text{ N}$  to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

*The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used. **9***

**11.7** *Replacement Modification:* **10**

Replace the first paragraph with the following:

*The appliance is operated under **normal operation** until steady conditions are established.*

**11.8** *Modification:*

Replace the first paragraph with the following:

*During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101. **11***

*Addition:*

*The temperature rise limits for handles and similar parts that are continuously held in normal use also apply to seats. The temperature rise of other surfaces in the **user area** shall not exceed*

the limits specified for handles and similar parts that are held for short periods only in normal use. Illuminated surfaces of glass or plastic that are not intended to be touched by the user are considered to be outside the **user area**.

**Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions**

| Surface  | Temperature rise of external accessible surfaces <sup>a</sup>  |                                  |                |
|--|--|----------------------------------|----------------|
|  | K  |                                  |                |
|  | All surfaces of kiddie rides and user area surfaces of appliances situated not more than 850 mm above the floor after installation | Surfaces in the maintenance area | Other surfaces |
| Bare metal   | 38   | 48                               | 42             |
| Coated metal <sup>b</sup>                            | 42   | 59                               | 49             |
| Glass and ceramic                                    | 51   | 65                               | 56             |
| Plastic and plastic coating > 0,4 mm <sup>c, d</sup> | 58   | 74                               | 62             |

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

<sup>a</sup> For appliances other than **kiddie rides**, temperature rises are not measured on:

- the underside of appliances intended to be used on a working surface or floor, where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end;
- the rear surface of appliances which, according to the instructions, shall be placed against a wall and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end.

<sup>b</sup> Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.

<sup>c</sup> The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.

<sup>d</sup> When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.

## 12 ~~Void~~ Charging of metal-ion batteries

This clause of Part 1 is applicable. **12**

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

## 14 Transient overvoltages

This clause of Part 1 is applicable.

## 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

## 15.2 Addition:

Compliance is also checked by the tests of 15.2.101 to 15.2.104 using the spillage solution.

**15.2.101** Appliances having external surfaces that are lower than 2 m above the floor, and on which it is possible to place a vessel such as a cup, are tested by rapidly pouring 0,5 l of spillage solution over the surface. If there is more than one surface, they are tested in turn.

**15.2.102** Appliances with accessible openings that are lower than 2 m above the floor are tested by slowly pouring 0,25 l of spillage solution into each opening. If the opening is in a vertical surface, the solution is projected towards the opening. Accessible openings include slots for coins or cards.

**15.2.103** **Maintenance operations** involving the use of liquids are carried out three times.

**15.2.104** Parts liable to be cleaned are wiped with a sponge having dimensions approximately 150 mm × 75 mm × 50 mm, saturated with spillage solution. The sponge is applied without appreciable force for approximately 10 s to each surface. This test is not applied to surfaces in the **maintenance area** for which cleaning instructions are given.

## 15.3 Addition:

If it is not possible to place the appliance in the humidity cabinet, electrical parts are tested separately.

## 16 Leakage current and electric strength

This clause of Part 1 is applicable.

## 17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

## 18 Endurance

This clause of Part 1 is not applicable.

## 19 Abnormal operation

This clause of Part 1 is applicable except as follows.

### 19.1 Addition:

Appliances are also subjected to the test of 19.101.

**Detachable parts** in the **user area** are removed or placed in the most unfavourable position.

**Detachable parts** in the **maintenance area** are placed in their normal position following a **maintenance operation**.

Containers are filled to the most unfavourable level.

**19.2 Addition:**

~~NOTE 101~~—Examples of achieving restricted heat dissipation are:

- operating without water;
- switching off the fan;
- covering ventilation openings.

**19.4 Addition:**

*If a control also performs other functions, only the part controlling the temperature is short-circuited.*

**19.7 Addition:**

*The appliance is operated with the most unfavourable cycle for the motor under test.*

**19.9 Addition:**

*This test is applicable for **kiddie rides**, regardless of their method of control.*

**19.11.2 Modification:**

Replace the penultimate paragraph with the following: **13**

*The fault conditions are simulated until steady conditions are established.*

**19.13 Addition:**

*During the tests, molten plastic shall not be emitted.*

*After the tests, compliance with 15.1 and 15.2 shall not be impaired.*

**19.101** *The appliance is supplied at **rated voltage** and operated under **normal operation**. Any fault condition or unexpected operation likely to occur during use of the appliance is introduced. Damaged components or parts affecting the result of subsequent tests are replaced after each test.*

~~NOTE 2~~—Examples of fault conditions or unexpected operations are

- defects in the appliance:
  - a programmer stopping in any position;
  - disconnection and reconnection of one or more phases of the supply mains during any part of the programme;
  - open-circuiting or short-circuiting of components;
  - locking the main contacts of a contactor in the "on" position if they are used for energizing heating elements. However, this defect is not introduced if at least two independent sets of contacts are provided. This may be achieved by two contactors operating independently of each other or by one contactor having two independent armatures operating two independent sets of main contacts;
  - failure of a pneumatic or hydraulic control;
  - blocking the coin or prize channel;

- *faulty operation by users or **maintenance persons**:*
  - *incorrect actuation of knobs, handles, switches or push-buttons;*
  - *incorrect opening or closing of doors or lids;*
  - *improper application of the **instructions for maintenance**;*
  - *setting controls, switches or programmers in the most unfavourable position;*
  - *incorrect loading;*
  - *incorrect coin collection;*
- *abuse by users:*
  - *openings;*
  - *blocking moving parts.*

NOTE 3 In general, tests are limited to the fault conditions that ~~may~~ can be expected to give the most unfavourable results.

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

### 20.1 Modification:

Delete the last two paragraphs and replace the fourth paragraph of the test specification with the following: **14**

*The appliance is tested with doors, lids and similar parts in the **maintenance area** placed in the normal position of use. **Kiddie rides** and driving simulators are loaded as specified for **normal operation**.*

*Addition:*

***Kiddie rides** and driving simulators, while still placed on the plane inclined by 10°, are then supplied at **rated voltage** and operated under **normal operation**.*

~~*The test with the appliance tilted to 15° is not carried out.*~~

~~*Addition:*~~

~~*The test is repeated with doors, lids and similar parts in the **maintenance area** placed in the most unfavourable positions, however, the appliance is only tilted to an angle of 5°.*~~

### 20.2 Addition:

Covers over moving parts having a kinetic energy exceeding 4 J shall be interlocked so that it is only possible to remove them when the parts are stationary unless they are only removable with the aid of a **tool**.

*For **kiddie rides**, compliance is also checked by applying a spherical probe having a diameter of 150 mm. The probe shall not be trapped by the movement of any parts.*

*For parts of appliances situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **15***

*Probes 18 and 19 are only applied to surfaces in the **user area**. 16*

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

### 21.1 Addition:

*The impact energy of 0,5 J is applied in the **maintenance area**. In the **user area**, the value is increased to*

- 2,0 J, for floor mounted appliances;
- 1,0 J, for other appliances.

## 22 Construction

This clause of Part 1 is applicable except as follows.

### 22.7 Addition:

Pressure relief devices shall be constructed so that they cannot be rendered inoperative or set to a higher pressure without the aid of a **tool** that is normally only available to the manufacturer.

*Compliance is checked by inspection.*

### 22.14 Addition:

The requirement also applies in the **maintenance area** to parts liable to be touched during **maintenance operations**.

### 22.44 Addition:

The requirement is not applicable to amusement machines.

**22.101** Appliances shall be constructed so that interlocks cannot be rendered inoperative without using an **override key** if they are necessary for compliance with the standard.

It shall not be possible to reset **thermal cut-outs** from the **user area**.

*Compliance is checked by inspection, by manual test and by applying test probe B of IEC 61032 with a force of 5 N 17 and, for interlocks located in the **user area** and for **thermal cut-outs**, test probe 18 of IEC 61032 with a force of 2,5 N.*

**22.102** It shall not be possible to gain access to the **service area** by only using the **access key** for the **maintenance area**.

*Compliance is checked by inspection and by manual test.*

~~**22.103** Appliances incorporating lasers shall comply with 6.2 of IEC 60065:2001.~~

~~*Compliance is checked by inspection and by the relevant tests. 18*~~

~~**22.104**~~**22.103** Coin boxes and containers for other payment means shall be positioned or protected so that overfilling cannot ~~cause a hazard~~ impair compliance with this standard.

*Compliance is checked by inspection.*

**22.105104** Seats of **kiddie rides** shall not be adjustable to a height exceeding 1,5 m above the floor. **Kiddie rides** with adjustable seats shall be provided with means for restraining passengers. The width of any slots in barriers provided for this purpose shall be between 60 mm and 75 mm.

~~NOTE~~—Examples of restraining means are hand holds, foot wells, seat belts and lap bars.

*Compliance is checked by inspection and by measurement.*

**22.106105** For appliances that are controlled by programmable **electronic circuits** that limit the number of heating elements and motors from being energised at the same time, simultaneous activation of any combination of heating elements and motors shall not render the appliance unsafe.

*Compliance is checked as follows:*

- *the fault/error conditions specified in Table R.1 are applied and evaluated in accordance with the relevant requirements of normative Annex R; or*
- *the appliance is operated under the conditions of Clause 11 while being supplied at **rated voltage**, the programmable **electronic circuits** being modified to allow simultaneous activation of all heaters and motors under their control. Under these conditions, compliance with 19.13 shall be fulfilled.*

## 23 Internal wiring

This clause of Part 1 is applicable except as follows.

### 23.3 ~~Modification~~ Addition:

This requirement also applies to **maintenance operations**.

*Modification:*

Replace the last sentence of the third paragraph of the test specification with the following: **19**

*The number of flexings is*

- *200 000, for conductors flexed during normal use;*
- *10 000, for conductors flexed during **maintenance operations**.*

**23.101** Anchorages for internal wiring that ~~can easily~~ are intended to be replaced by a **maintenance person** shall be constructed and located so that

- the wiring cannot touch the clamping screws of the anchorage if these screws are accessible, unless they are separated from **accessible metal parts** by **supplementary insulation**;
- the wiring is not clamped by a metal screw that bears directly on the wiring;
- for **class I appliances**, the anchorages are of insulating material or are provided with an insulating lining, unless failure of the insulation of the wiring does not make **accessible metal parts** live;
- for **class II appliances**, the anchorages are of insulating material or if of metal, they are insulated from **accessible metal parts** by **supplementary insulation**.

*Compliance is checked by inspection.*

**23.102** Internal wiring that is accessible in the **maintenance area** and that is moved during **normal operation** shall comply with 25.13, 25.14, 25.15 and 25.21.

*Compliance is checked by the relevant tests.*

## 24 Components

This clause of Part 1 is applicable except as follows.

### 24.1 Addition:

If part of the appliance is within the scope of ~~IEC 60065, IEC 60950-1 or IEC 62368-1~~ the part has to comply with the relevant standard as far as it reasonably applies.

#### 24.1.3 Addition:

*The number of operations specified for interlock switches required for compliance with this standard shall be 100 000 if the switch is operated one or more times per operating cycle. 20*

### 24.2 ~~Modification~~ Addition:

Switches and automatic controls operating at **safety extra-low voltage** may be fitted in **interconnection cords** in the **maintenance area**.

**24.101** Connecting devices of **interconnection cords** shall be identified if they are interchangeable with other connecting means in the appliance if this could ~~result in a hazard~~ impair compliance with this standard.

Colour coding may be used for identification.

*Compliance is checked by inspection.*

**24.102** Interlock switches required for compliance with this standard shall ensure **all pole disconnection** ~~in accordance with IEC 61058-1~~. However, single-pole disconnection is allowed for protection against mechanical ~~hazards~~ injury.

~~Compliance is checked by testing the switch in accordance with the relevant clauses of IEC 61058-1, the number of cycles of operation for the test of Clause 17 being 10 000. However, if the switch is operated once per operating cycle, the number of cycles of operation is 100 000. 21~~

*Compliance is checked by inspection*

**24.103 Thermal cut-outs** that disconnect heating elements and are incorporated for compliance with Clause 19, shall not be **self-resetting thermal cut-outs** and shall have a trip-free mechanism.

*Compliance is checked by inspection and by manual test.*

## 25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

**25.7 Addition:**

**Supply cords** of appliances intended for outdoor use shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed cord (code designation 60245 IEC 57). However, if the appliance is intended to be placed on the ground, the **supply cord** shall not be lighter than heavy polychloroprene sheathed cord (code designation 60245 IEC 66).

**25.15 Addition:**

*When the test is carried out on internal wiring, the pull force is 30 N and the torque 0,1 Nm, irrespective of the mass of the appliance.*

*For internal wiring, a force of 30 N is applied when pushing the wiring into the appliance.*

## **26 Terminals for external conductors**

This clause of Part 1 is applicable.

## **27 Provision for earthing**

This clause of Part 1 is applicable.

## **28 Screws and connections**

This clause of Part 1 is applicable except as follows.

**28.1 Addition:**

The requirement also applies to screws that ~~may be~~ are removed during **maintenance operations**.

*The test also applies to screws ~~likely to be~~ that are tightened during **maintenance operations**.*

**28.3 Addition:**

The requirement also applies to screws operated by the **maintenance person**.

## **29 Clearances, creepage distances and solid insulation**

This clause of Part 1 is applicable except as follows.

**29.1 Modification:**

~~The force applied to **accessible surfaces** is increased to 100 N.~~

Replace the second dashed item in the penultimate paragraph with the following:

- 100 N, for **accessible surfaces**. **22**

**29.2 Modification:**

~~The force applied to **accessible surfaces** is increased to 100 N.~~

Replace the second dashed item in the fifth paragraph with the following:

- 100 N, for **accessible surfaces**. **23**

### 30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

**30.2.2** Not applicable.

### 31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

*Addition:*

*For appliances intended for outdoor use, compliance is checked by the salt mist test of IEC 60068-2-52, ~~severity~~ test method 2 being applicable.*

*Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing the pin along the surface of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.*

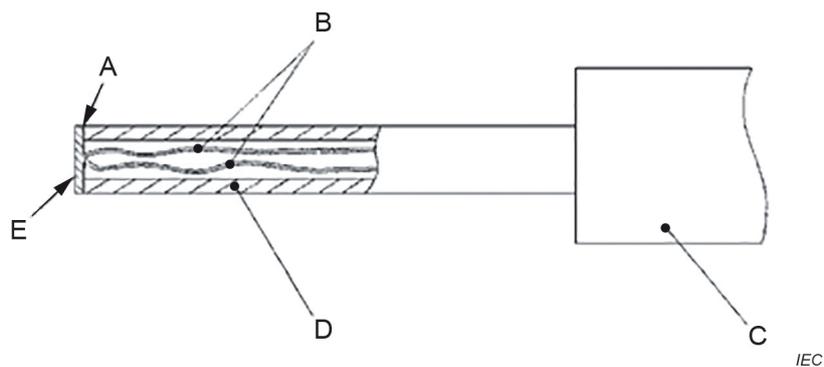
*After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clause 8 and Clause 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.*

### 32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

**32.101** Appliances incorporating lasers shall comply with IEC 60065:2001 and IEC 60065:2001/AMD2:2010, 6.2.

*Compliance is checked by inspection and by the relevant tests.* **24**



**Key**

- A adhesive
- B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K
- C handle arrangement permitting a contact force of  $4\text{ N} \pm 1\text{ N}$
- D polycarbonat tube: inside diameter 3 mm, outside diameter 5 mm
- E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

**Figure 101 – Probe for measuring surface temperatures**

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## Annexes

The annexes of Part 1 are applicable, except as follows:

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## Annex B (normative)

### Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

This annex of Part 1 is applicable except as follows:

#### B.22.3 Addition:

*For parts of appliances situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **25***

*Probes 18 and 19 are applied only to surfaces in the **user area**. **26***

#### B.22.4 Addition:

*For parts of **batteries** situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **27***

*Probes 18 and 19 are applied only to surfaces in the **user area**. **28***

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## Annex R (normative)

### Software evaluation

This annex of Part 1 is applicable except as follows:

#### R.2.2.5 *Modification:*

Replace the first paragraph with the following:

For other programmable **electronic circuits** with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur before if compliance with Clause 19 ~~and~~ or 22. ~~406~~105 is impaired.

#### R.2.2.9 *Modification:*

Replace the first sentence with the following:

For other programmable **electronic circuits**, the software and safety-related hardware under its control shall be initialized and shall terminate before if compliance with Clause 19 ~~and~~ or 22. ~~406~~105 is impaired.

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## Bibliography

The Bibliography of Part 1 is applicable except as follows.

*Addition:*

IEC 60335-2-75, *Household and similar electrical appliances – Safety – Part 2-75: Particular requirements for commercial dispensing appliances and vending machines*

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## List of comments

- 1 This revision is for alignment with IEC 60335-1:2020.
- 2 This revision is for alignment with IEC 60335-1:2020.
- 3 This revision is for alignment with IEC 60335-1:2020.
- 4 This revision maintains the normal operation while charging as specified in IEC 60335-1:2020.
- 5 Standby mode is changed to “ready mode” to avoid possible conflict with the phrase “stand-by mode” used in Subclauses 19.11, 19.11.4 and 19.13 of IEC 60335-1.
- 6 This is incorporated into Subclauses 8.1.1 and 20.2.
- 7 Appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applicable. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.
- 8 This is relocated from Subclause 5.102 of the previous edition and updated to also include test probe 19.
- 9 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces based on IEC Guide 117 for Temperatures of touchable hot surfaces.
- 10 This revision maintains the requirements for appliance outlets and socket outlets and the test duration for charging of battery-operated appliances as specified in IEC 60335-1:2020.
- 11 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces based on IEC Guide 117 for Temperatures of touchable hot surfaces.
- 12 This revision is for alignment with IEC 60335-1:2020.
- 13 The modification of the Part 1 standard is specified.
- 14 The modification of the Part 1 standard is specified in more detail.
- 15 Appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applicable. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.
- 16 This is relocated from Subclause 5.102 of the previous edition and updated to also include test probe 19.
- 17 Due to the addition of Subclause 5.21 in the Part 1, the force applied to test probe B is specified to align with that specified in Subclause 20.2 of Part 1.
- 18 This requirement is moved to Clause 32 since it is related to optical radiation.
- 19 The modification of the Part 1 standard is specified in more detail.
- 20 This is relocated from Subclause 24.102 since it is related to the number of endurance cycles required for switches which are specified in Subclause 24.1.3.
- 21 This is relocated to Subclause 24.1.3 which specifies the number of endurance cycles required for switches.
- 22 The modification of the Part 1 standard is specified in more detail.
- 23 The modification of the Part 1 standard is described in more detail.

- 24 This requirement is relocated from Subclause 22.103 in the previous edition to Clause 32 since it is related to optical radiation.
- 25 Battery-operated appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applied to battery-operated appliances, detachable batteries and separable batteries. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.
- 26 This is relocated from Subclause 5.102 of the previous edition and updated to also include test probe 19.
- 27 Battery-operated appliance can be located on the floor where they would be accessible to children up to 3 years in age, so test probe 19 is applied to battery-operated appliances, detachable batteries and separable batteries. However, appliances and parts of appliances located above 850 mm from the floor are not considered to be within reach of these children, so test probe 19 is not applied.
- 28 This is relocated from Subclause 5.102 of the previous edition and updated to also include test probe 19.

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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –  
Part 2-82: Particular requirements for amusement machines and personal  
service machines**

**Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-82: Exigences particulières pour les machines de divertissement et les  
machines de service pour les personnes**

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## CONTENTS

|  |    |
|--|----|
| FOREWORD.....  | 4  |
| INTRODUCTION.....  | 7  |
| 1 Scope.....   | 8  |
| 2 Normative references .....   | 9  |
| 3 Terms and definitions .....  | 9  |
| 4 General requirement.....   | 11 |
| 5 General conditions for the tests .....   | 11 |
| 6 Classification.....  | 12 |
| 7 Marking and instructions.....  | 12 |
| 8 Protection against access to live parts.....   | 13 |
| 9 Starting of motor-operated appliances .....  | 14 |
| 10 Power input and current.....  | 14 |
| 11 Heating.....  | 14 |
| 12 Charging of metal-ion batteries.....  | 15 |
| 13 Leakage current and electric strength at operating temperature.....   | 15 |
| 14 Transient overvoltages .....  | 15 |
| 15 Moisture resistance .....   | 15 |
| 16 Leakage current and electric strength.....  | 16 |
| 17 Overload protection of transformers and associated circuits .....   | 16 |
| 18 Endurance .....   | 16 |
| 19 Abnormal operation .....  | 16 |
| 20 Stability and mechanical hazards.....   | 18 |
| 21 Mechanical strength .....   | 19 |
| 22 Construction .....  | 19 |
| 23 Internal wiring.....  | 20 |
| 24 Components .....  | 21 |
| 25 Supply connection and external flexible cords .....   | 21 |
| 26 Terminals for external conductors.....  | 22 |
| 27 Provision for earthing .....  | 22 |
| 28 Screws and connections .....  | 22 |
| 29 Clearances, creepage distances and solid insulation .....   | 22 |
| 30 Resistance to heat and fire .....   | 22 |
| 31 Resistance to rusting.....  | 23 |
| 32 Radiation, toxicity and similar hazards.....  | 23 |
| Annexes .....  | 24 |
| Annex B (normative) Battery-operated appliances, separable batteries and detachable<br>batteries for battery-operated appliances ..... | 25 |
| Annex R (normative) Software evaluation .....  | 26 |
| Bibliography.....  | 27 |
| Figure 101 – Probe for measuring surface temperatures.....   | 23 |

Table 101 – Maximum temperature rises for specified external accessible surfaces  
under normal operating conditions ..... 15

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –****Part 2-82: Particular requirements for amusement machines and  
personal service machines**

## 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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IEC 60335-2-82 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2017 and Amendment 1:2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, 19.2, 19.101, 22.104);
- c) introduction of test probe 18 (22.101);

- d) introduction of test probe 19 (8.1.1, 20.2);
- e) addition of surface temperature rise limits (11.3, 11.8, Table 101).

The text of this International Standard is based on the following documents:

| Draft        | Report on voting |
|--------------|------------------|
| 61/7273/FDIS | 61/7299/RVD      |

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for amusement machines and personal service machines.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- test specifications: *in italic type*;
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

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## INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules can differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 2-82: Particular requirements for amusement machines and personal service machines

#### 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric commercial amusement machines and personal service machines, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances, including direct current (DC) supplied appliances and **battery-operated appliances**.

Examples of appliances that are within the scope of this standard are

- amusement machines:
  - billiard tables;
  - bowling machines;
  - dartboards;
  - driving simulators;
  - gaming machines;
  - **kiddie rides**;
  - laser shooting appliances;
  - pinball machines;
  - video games;
- personal service machines:
  - card re-value machines;
  - currency dispensers;
  - luggage lockers;
  - weighing machines;
  - shoe shining appliances.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by users and **maintenance persons**.

Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can be necessary;
- in many countries, additional requirements are specified by the national authorities responsible for health, for the protection of labour and similar authorities.

This standard does not apply to

- appliances intended exclusively for household use;
- appliances intended exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- appliances for washing cars;
- dispensing appliances and vending machines (IEC 60335-2-75);
- appliances within the scope of IEC 62368-1, such as jukeboxes, household video games, copying machines, ticket machines and automatic teller machines;
- appliances intended to be used when a trained attendant is present, such as virtual reality systems;
- equipment intended exclusively for fairgrounds, such as carousels;
- self-balancing personal transport devices (IEC 60335-2-114).

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60065:2001<sup>1</sup>, *Audio, video and similar electronic apparatus – Safety requirements*  
IEC 60065:2001/AMD1:2005  
IEC 60065:2001/AMD2:2010

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

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

## 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

### 3.1 Definitions relating to physical characteristics

#### 3.1.9 *Modification:* **normal operation**

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

The appliance is operated in the **ready mode** until steady conditions are established and then under the most unfavourable conditions of normal use.

The appliance is refilled when necessary in accordance with the instructions for use, or the **instructions for maintenance**, and the next operating period started as soon as possible.

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<sup>1</sup> There exists a consolidated edition 7.2 (2010) that includes edition 7 and its Amendment 1 and Amendment 2. This publication has been withdrawn.

Appliances that support persons in normal use are loaded as follows:

- **kiddie rides**, 50 kg for each riding position;
- other appliances, 100 kg for the first riding position and 75 kg for each additional riding position.

Note 101 to entry: The riding position can be for a sitting or standing person.

If the instructions state that higher loads are allowed, the appliance is loaded accordingly.

Audio amplifiers are operated in accordance with the normal operating conditions specified in IEC 62368-1.

### 3.5 Definitions relating to types of appliances

#### 3.5.101

##### **kiddie ride**

moving appliance having a stationary base for use by one or two children between the ages of three and ten years, under the supervision of an adult

### 3.6 Definitions relating to parts of appliances

#### 3.6.2 *Replacement:*

##### **detachable part**

part that can be removed without the aid of a **tool**, part that is removed in accordance with the instructions for use or **instructions for maintenance**, even if a **tool** or **access key** is necessary for removal, or part that does not fulfil the test of 22.11

Note 1 to entry: If a part has to be removed for installation purposes, this part is not considered to be detachable even if the instructions state that it is to be removed.

Note 2 to entry: A part that can be opened is considered to be a part that can be removed.

#### 3.6.101

##### **access key**

key or other means that gives access to the **maintenance area** but does not give access to the **service area**

Note 1 to entry: "Other means" includes a **tool** or operation by codes or signals produced by optical or electromagnetic sources.

#### 3.6.102

##### **override key**

key or other means that is used to render an interlock inoperative

#### 3.6.103

##### **user area**

area where access is gained without the use of an **access key** or a **tool**

#### 3.6.104

##### **maintenance area**

area where access can only be gained by the use of an **access key**

#### 3.6.105

##### **service area**

area where access cannot be gained by the use of an **access key** alone

### 3.7 Definitions relating to safety components

#### 3.7.3 Replacement:

##### **thermal cut-out**

device that during abnormal operation limits the temperature of the controlled part by automatically opening the circuit, or reducing the current, and constructed so that its setting cannot be altered by the user or the **maintenance person**

### 3.8 Definitions relating to miscellaneous matters

#### 3.8.5 Replacement:

##### **maintenance operation**

operation that the user or **maintenance person** is intended to perform as stated in the instructions for use, or the **instructions for maintenance**, or as marked on the appliance

Note 1 to entry: The **instructions for maintenance** marked on the appliance, or supplied with the appliance or subsequently, are applicable only to the **user area** and the **maintenance area**.

Note 2 to entry: **Maintenance operation** includes preparing and commissioning the appliance for new operating methods. It does not include operations that are to be performed in the **service area**.

#### 3.8.101

##### **instructions for maintenance**

instructions explaining how to carry out cleaning, replenishing, coin collecting, setting of controls and similar operations

#### 3.8.102

##### **maintenance person**

person who maintains the appliance in accordance with the **instructions for maintenance**

#### 3.8.103

##### **ready mode**

mode of the appliance when it is energized and ready for use, while filled as intended but with empty cash boxes

## 4 General requirement

This clause of Part 1 is applicable.

## 5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

#### 5.6 Replacement:

*Controls or switching devices in the **user area** are adjusted to the most unfavourable setting.*

*Controls, switching devices or other parts in the **maintenance area** are adjusted to the most unfavourable setting within the limits stated in the **instructions for maintenance**; however, controls or switching devices in the **service area** are not adjusted.*

#### 5.9 Addition:

*When alternative software is made available by the appliance manufacturer, the appliance is tested with the software that gives the most unfavourable results.*

**5.101** The requirements of this standard for the **maintenance area** are applicable when the **instructions for maintenance** are being followed. If an **override key** is provided for access to the **maintenance area**, it is used before a test is carried out if this is more unfavourable.

**5.102** Appliances incorporating transformers, **electronic circuits** and lamps are tested as **motor-operated appliances** unless they incorporate a heating element, in which case they are tested as **combined appliances**.

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Modification:

Replace the first paragraph with the following:

Appliances shall be **class I**, **class II** or **class III**.

### 6.2 Addition:

Appliances intended for outdoor use shall be at least IPX4.

Appliances that are intended to be cleaned by water jets or installed where water jets are liable to be used shall be at least IPX5.

Appliances that use water jets in normal use shall be at least IPX5 unless the water jet cannot be directed at the enclosure of electrical parts, in which case it may be IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

For appliances incorporating a socket outlet, the voltage, nature of the supply and current or power output shall be marked in the vicinity of the socket outlet.

### 7.3 Addition:

The requirement also applies when the adjustment has to be made by the **maintenance person**.

### 7.12 Modification:

The instructions concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance are not applicable.

#### 7.12.1 Addition:

The installation instructions shall state if the appliance is suitable for outdoor use.

For appliances that are not at least IPX5, the instructions shall state that the appliance is not suitable for installation in an area where a water jet could be used.

The installation instructions for moving ride appliances shall state the free space necessary around the appliance for safe operation.

The installation instructions for **kiddie rides** shall state that the installation of a residual current device (RCD) having a rated residual operating current not exceeding 30 mA is advisable.

**7.12.101** If it is necessary to take special precautions during **maintenance operations**, details of these shall be supplied. The **instructions for maintenance** shall state how to gain access to the **maintenance area**. They shall not include instructions on how to gain access to a **service area**.

*Compliance is checked by inspection.*

**7.12.101.1** The **instructions for maintenance** for appliances incorporating an appliance inlet and intended to be partially or completely immersed in water for cleaning shall state that the connector must be removed before the appliance is cleaned and that the appliance inlet must be dried before the appliance is used again.

If the appliance is not at least IPX5, the **instructions for maintenance** shall state that the appliance must not be cleaned by a water jet.

*Compliance is checked by inspection.*

**7.12.101.2** If the use of an **override key** allows access to moving parts, a suitable warning shall be given in the **instructions for maintenance**.

*Compliance is checked by inspection.*

**7.12.101.3** The **instructions for maintenance** shall list any accessories that may be used with the appliance.

*Compliance is checked by inspection.*

**7.12.101.4** For appliances using water, the **instructions for maintenance** shall give details on how to prevent freezing-up or how to ensure safe operation if freezing-up occurs.

*Compliance is checked by inspection.*

## **8 Protection against access to live parts**

This clause of Part 1 is applicable except as follows.

### **8.1.1** *Addition:*

*For parts of appliances situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

*Probes 18 and 19 are applied only to surfaces in the **user area**.*

### **8.1.3** *Addition:*

*Test probe 19 is not applied.*

## 9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

## 10 Power input and current

This clause of Part 1 is applicable.

## 11 Heating

This clause of Part 1 is applicable except as follows.

### 11.2 Addition:

*Appliances intended to be fixed to the floor, and those having a mass greater than 40 kg and not provided with casters or rollers, are installed in accordance with the instructions. If no instructions are provided, the appliance is placed on the floor as close to the walls as possible.*

*Other appliances, except **fixed appliances**, are placed on the floor as near to the walls as possible.*

### 11.3 Addition:

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 101 is used to measure the temperature rises of external **accessible surfaces** in the **user area** or **maintenance area** specified in Table 101. The probe is applied with a force of  $4\text{ N} \pm 1\text{ N}$  to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

*The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.*

### 11.7 Modification:

Replace the first paragraph with the following:

*The appliance is operated under **normal operation** until steady conditions are established.*

### 11.8 Modification:

Replace the first paragraph with the following:

*During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.*

### Addition:

*The temperature rise limits for handles and similar parts that are continuously held in normal use also apply to seats. The temperature rise of other surfaces in the **user area** shall not exceed the limits specified for handles and similar parts that are held for short periods only in normal use. Illuminated surfaces of glass or plastic that are not intended to be touched by the user are considered to be outside the **user area**.*

**Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions**

| Surface  | Temperature rise of external accessible surfaces <sup>a</sup>  |                                  |                |
|--|--|----------------------------------|----------------|
|  | K  |                                  |                |
|  | All surfaces of kiddie rides and user area surfaces of appliances situated not more than 850 mm above the floor after installation | Surfaces in the maintenance area | Other surfaces |
| Bare metal   | 38   | 48                               | 42             |
| Coated metal <sup>b</sup>                            | 42   | 59                               | 49             |
| Glass and ceramic                                    | 51   | 65                               | 56             |
| Plastic and plastic coating > 0,4 mm <sup>c, d</sup> | 58   | 74                               | 62             |

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

<sup>a</sup> For appliances other than **kiddie rides**, temperature rises are not measured on:

- the underside of appliances intended to be used on a working surface or floor, where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end;
- the rear surface of appliances which, according to the instructions, shall be placed against a wall and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end.

<sup>b</sup> Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.

<sup>c</sup> The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.

<sup>d</sup> When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.

## 12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

## 14 Transient overvoltages

This clause of Part 1 is applicable.

## 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

### 15.2 Addition:

Compliance is also checked by the tests of 15.2.101 to 15.2.104 using the spillage solution.

**15.2.101** Appliances having external surfaces that are lower than 2 m above the floor, and on which it is possible to place a vessel such as a cup, are tested by rapidly pouring 0,5 l of spillage solution over the surface. If there is more than one surface, they are tested in turn.

**15.2.102** Appliances with accessible openings that are lower than 2 m above the floor are tested by slowly pouring 0,25 l of spillage solution into each opening. If the opening is in a vertical surface, the solution is projected towards the opening. Accessible openings include slots for coins or cards.

**15.2.103** **Maintenance operations** involving the use of liquids are carried out three times.

**15.2.104** Parts liable to be cleaned are wiped with a sponge having dimensions approximately 150 mm × 75 mm × 50 mm, saturated with spillage solution. The sponge is applied without appreciable force for approximately 10 s to each surface. This test is not applied to surfaces in the **maintenance area** for which cleaning instructions are given.

**15.3** Addition:

If it is not possible to place the appliance in the humidity cabinet, electrical parts are tested separately.

## **16 Leakage current and electric strength**

This clause of Part 1 is applicable.

## **17 Overload protection of transformers and associated circuits**

This clause of Part 1 is applicable.

## **18 Endurance**

This clause of Part 1 is not applicable.

## **19 Abnormal operation**

This clause of Part 1 is applicable except as follows.

**19.1** Addition:

Appliances are also subjected to the test of 19.101.

**Detachable parts** in the **user area** are removed or placed in the most unfavourable position.

**Detachable parts** in the **maintenance area** are placed in their normal position following a **maintenance operation**.

Containers are filled to the most unfavourable level.

**19.2 Addition:**

Examples of achieving restricted heat dissipation are:

- operating without water;
- switching off the fan;
- covering ventilation openings.

**19.4 Addition:**

*If a control also performs other functions, only the part controlling the temperature is short-circuited.*

**19.7 Addition:**

*The appliance is operated with the most unfavourable cycle for the motor under test.*

**19.9 Addition:**

*This test is applicable for **kiddie rides**, regardless of their method of control.*

**19.11.2 Modification:**

Replace the penultimate paragraph with the following:

*The fault conditions are simulated until steady conditions are established.*

**19.13 Addition:**

*During the tests, molten plastic shall not be emitted.*

*After the tests, compliance with 15.1 and 15.2 shall not be impaired.*

**19.101** *The appliance is supplied at **rated voltage** and operated under **normal operation**. Any fault condition or unexpected operation likely to occur during use of the appliance is introduced. Damaged components or parts affecting the result of subsequent tests are replaced after each test.*

*Examples of fault conditions or unexpected operations are*

- defects in the appliance:
  - *a programmer stopping in any position;*
  - *disconnection and reconnection of one or more phases of the supply mains during any part of the programme;*
  - *open-circuiting or short-circuiting of components;*
  - *locking the main contacts of a contactor in the "on" position if they are used for energizing heating elements. However, this defect is not introduced if at least two independent sets of contacts are provided. This may be achieved by two contactors operating independently of each other or by one contactor having two independent armatures operating two independent sets of main contacts;*
  - *failure of a pneumatic or hydraulic control;*
  - *blocking the coin or prize channel;*

- *faulty operation by users or **maintenance persons**:*
  - *incorrect actuation of knobs, handles, switches or push-buttons;*
  - *incorrect opening or closing of doors or lids;*
  - *improper application of the **instructions for maintenance**;*
  - *setting controls, switches or programmers in the most unfavourable position;*
  - *incorrect loading;*
  - *incorrect coin collection;*
- *abuse by users:*
  - *openings;*
  - *blocking moving parts.*

NOTE In general, tests are limited to the fault conditions that can be expected to give the most unfavourable results.

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

### 20.1 Modification:

Delete the last two paragraphs and replace the fourth paragraph of the test specification with the following:

*The appliance is tested with doors, lids and similar parts in the **maintenance area** placed in the normal position of use. **Kiddie rides** and driving simulators are loaded as specified for **normal operation**.*

*Addition:*

***Kiddie rides** and driving simulators, while still placed on the plane inclined by 10°, are then supplied at **rated voltage** and operated under **normal operation**.*

*The test is repeated with doors, lids and similar parts in the **maintenance area** placed in the most unfavourable positions, however, the appliance is only tilted to an angle of 5°.*

### 20.2 Addition:

Covers over moving parts having a kinetic energy exceeding 4 J shall be interlocked so that it is only possible to remove them when the parts are stationary unless they are only removable with the aid of a **tool**.

*For **kiddie rides**, compliance is also checked by applying a spherical probe having a diameter of 150 mm. The probe shall not be trapped by the movement of any parts.*

*For parts of appliances situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

*Probes 18 and 19 are only applied to surfaces in the **user area**.*

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

### 21.1 Addition:

The impact energy of 0,5 J is applied in the **maintenance area**. In the **user area**, the value is increased to

- 2,0 J, for floor mounted appliances;
- 1,0 J, for other appliances.

## 22 Construction

This clause of Part 1 is applicable except as follows.

### 22.7 Addition:

Pressure relief devices shall be constructed so that they cannot be rendered inoperative or set to a higher pressure without the aid of a **tool** that is normally only available to the manufacturer.

*Compliance is checked by inspection.*

### 22.14 Addition:

The requirement also applies in the **maintenance area** to parts liable to be touched during **maintenance operations**.

### 22.44 Addition:

The requirement is not applicable to amusement machines.

**22.101** Appliances shall be constructed so that interlocks cannot be rendered inoperative without using an **override key** if they are necessary for compliance with the standard.

It shall not be possible to reset **thermal cut-outs** from the **user area**.

*Compliance is checked by inspection, by manual test and by applying test probe B of IEC 61032 with a force of 5 N and, for interlocks located in the **user area** and for **thermal cut-outs**, test probe 18 of IEC 61032 with a force of 2,5 N.*

**22.102** It shall not be possible to gain access to the **service area** by only using the **access key** for the **maintenance area**.

*Compliance is checked by inspection and by manual test.*

**22.103** Coin boxes and containers for other payment means shall be positioned or protected so that overfilling cannot impair compliance with this standard.

*Compliance is checked by inspection.*

**22.104** Seats of **kiddie rides** shall not be adjustable to a height exceeding 1,5 m above the floor. **Kiddie rides** with adjustable seats shall be provided with means for restraining passengers. The width of any slots in barriers provided for this purpose shall be between 60 mm and 75 mm.

Examples of restraining means are hand holds, foot wells, seat belts and lap bars.

*Compliance is checked by inspection and by measurement.*

**22.105** For appliances that are controlled by programmable **electronic circuits** that limit the number of heating elements and motors from being energised at the same time, simultaneous activation of any combination of heating elements and motors shall not render the appliance unsafe.

*Compliance is checked as follows:*

- *the fault/error conditions specified in Table R.1 are applied and evaluated in accordance with the relevant requirements of normative Annex R; or*
- *the appliance is operated under the conditions of Clause 11 while being supplied at **rated voltage**, the programmable **electronic circuits** being modified to allow simultaneous activation of all heaters and motors under their control. Under these conditions, compliance with 19.13 shall be fulfilled.*

## **23 Internal wiring**

This clause of Part 1 is applicable except as follows.

### **23.3 Addition:**

This requirement also applies to **maintenance operations**.

*Modification:*

Replace the last sentence of the third paragraph of the test specification with the following:

*The number of flexings is*

- *200 000, for conductors flexed during normal use;*
- *10 000, for conductors flexed during **maintenance operations**.*

**23.101** Anchorages for internal wiring that are intended to be replaced by a **maintenance person** shall be constructed and located so that

- the wiring cannot touch the clamping screws of the anchorage if these screws are accessible, unless they are separated from **accessible metal parts** by **supplementary insulation**;
- the wiring is not clamped by a metal screw that bears directly on the wiring;
- for **class I appliances**, the anchorages are of insulating material or are provided with an insulating lining, unless failure of the insulation of the wiring does not make **accessible metal parts** live;
- for **class II appliances**, the anchorages are of insulating material or if of metal, they are insulated from **accessible metal parts** by **supplementary insulation**.

*Compliance is checked by inspection.*

**23.102** Internal wiring that is accessible in the **maintenance area** and that is moved during **normal operation** shall comply with 25.13, 25.14, 25.15 and 25.21.

*Compliance is checked by the relevant tests.*

## 24 Components

This clause of Part 1 is applicable except as follows.

### 24.1 Addition:

If part of the appliance is within the scope of IEC 62368-1 the part has to comply with the relevant standard as far as it reasonably applies.

#### 24.1.3 Addition:

*The number of operations specified for interlock switches required for compliance with this standard shall be 100 000 if the switch is operated one or more times per operating cycle.*

### 24.2 Addition:

Switches and automatic controls operating at **safety extra-low voltage** may be fitted in **interconnection cords** in the **maintenance area**.

**24.101** Connecting devices of **interconnection cords** shall be identified if they are interchangeable with other connecting means in the appliance if this could impair compliance with this standard.

Colour coding may be used for identification.

*Compliance is checked by inspection.*

**24.102** Interlock switches required for compliance with this standard shall ensure **all pole disconnection**. However, single-pole disconnection is allowed for protection against mechanical injury.

*Compliance is checked by inspection*

**24.103 Thermal cut-outs** that disconnect heating elements and are incorporated for compliance with Clause 19, shall not be **self-resetting thermal cut-outs** and shall have a trip-free mechanism.

*Compliance is checked by inspection and by manual test.*

## 25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

### 25.7 Addition:

**Supply cords** of appliances intended for outdoor use shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed cord (code designation 60245 IEC 57). However, if the appliance is intended to be placed on the ground, the **supply cord** shall not be lighter than heavy polychloroprene sheathed cord (code designation 60245 IEC 66).

#### 25.15 Addition:

*When the test is carried out on internal wiring, the pull force is 30 N and the torque 0,1 Nm, irrespective of the mass of the appliance.*

*For internal wiring, a force of 30 N is applied when pushing the wiring into the appliance.*

## **26 Terminals for external conductors**

This clause of Part 1 is applicable.

## **27 Provision for earthing**

This clause of Part 1 is applicable.

## **28 Screws and connections**

This clause of Part 1 is applicable except as follows.

### **28.1 Addition:**

The requirement also applies to screws that are removed during **maintenance operations**.

*The test also applies to screws that are tightened during **maintenance operations**.*

### **28.3 Addition:**

The requirement also applies to screws operated by the **maintenance person**.

## **29 Clearances, creepage distances and solid insulation**

This clause of Part 1 is applicable except as follows.

### **29.1 Modification:**

Replace the second dashed item in the penultimate paragraph with the following:

- 100 N, for **accessible surfaces**.

### **29.2 Modification:**

Replace the second dashed item in the fifth paragraph with the following:

- 100 N, for **accessible surfaces**.

## **30 Resistance to heat and fire**

This clause of Part 1 is applicable except as follows.

### **30.2.2** Not applicable.

### 31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

*Addition:*

*For appliances intended for outdoor use, compliance is checked by the salt mist test of IEC 60068-2-52, test method 2 being applicable.*

*Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing the pin along the surface of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.*

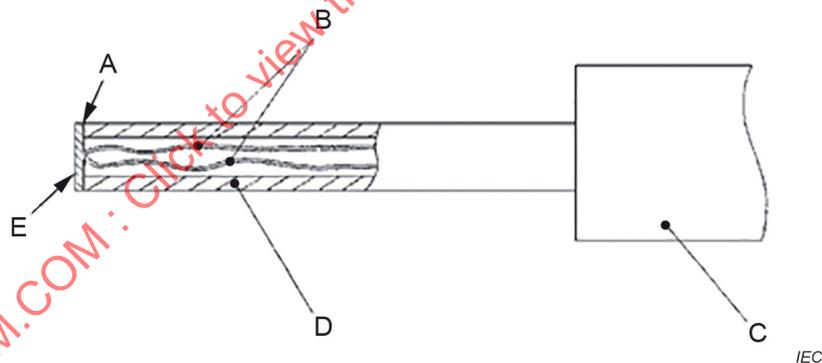
*After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clause 8 and Clause 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.*

### 32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

**32.101** Appliances incorporating lasers shall comply with IEC 60065:2001 and IEC 60065:2001/AMD2:2010, 6.2.

*Compliance is checked by inspection and by the relevant tests.*



#### Key

- A adhesive
- B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K
- C handle arrangement permitting a contact force of 4 N ± 1 N
- D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm
- E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

**Figure 101 – Probe for measuring surface temperatures**

## Annexes

The annexes of Part 1 are applicable, except as follows:

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## Annex B (normative)

### Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

This annex of Part 1 is applicable except as follows:

#### B.22.3 Addition:

*For parts of appliances situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

*Probes 18 and 19 are applied only to surfaces in the **user area**.*

#### B.22.4 Addition:

*For parts of **batteries** situated not more than 850 mm above the floor after installation or in normal use and for all parts of **kiddie rides**, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.*

*Probes 18 and 19 are applied only to surfaces in the **user area**.*

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## Annex R (normative)

### Software evaluation

This annex of Part 1 is applicable except as follows:

#### R.2.2.5 *Modification:*

Replace the first paragraph with the following:

For other programmable **electronic circuits** with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur before if compliance with Clause 19 or 22.105 is impaired.

#### R.2.2.9 *Modification:*

Replace the first sentence with the following:

For other programmable **electronic circuits**, the software and safety-related hardware under its control shall be initialized and shall terminate before if compliance with Clause 19 or 22.105 is impaired.

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## Bibliography

The Bibliography of Part 1 is applicable except as follows.

*Addition:*

IEC 60335-2-75, *Household and similar electrical appliances – Safety – Part 2-75: Particular requirements for commercial dispensing appliances and vending machines*

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## SOMMAIRE

|   |    |
|---|----|
| AVANT-PROPOS .....  | 30 |
| INTRODUCTION.....   | 33 |
| 1 Domaine d'application .....   | 35 |
| 2 Références normatives .....   | 36 |
| 3 Termes et Définitions.....  | 36 |
| 4 Exigences générales .....   | 38 |
| 5 Conditions générales d'essais .....   | 38 |
| 6 Classification .....  | 39 |
| 7 Marquage et instructions .....  | 39 |
| 8 Protection contre l'accès aux parties actives.....  | 41 |
| 9 Démarrage des appareils à moteur .....  | 41 |
| 10 Puissance et courant .....   | 41 |
| 11 Échauffements.....   | 41 |
| 12 Charge des batteries à ions métalliques .....  | 43 |
| 13 Courant de fuite et rigidité diélectrique à la température de régime .....   | 43 |
| 14 Surtensions transitoires .....   | 43 |
| 15 Résistance à l'humidité.....   | 43 |
| 16 Courant de fuite et rigidité diélectrique .....  | 43 |
| 17 Protection contre la surcharge des transformateurs et des circuits associés .....  | 43 |
| 18 Endurance .....  | 44 |
| 19 Fonctionnement anormal .....   | 44 |
| 20 Stabilité et dangers mécaniques .....  | 45 |
| 21 Résistance mécanique.....  | 46 |
| 22 Construction .....   | 46 |
| 23 Conducteurs internes.....  | 48 |
| 24 Composants .....   | 48 |
| 25 Raccordement au réseau et câbles souples extérieurs .....  | 49 |
| 26 Bornes pour conducteurs externes .....   | 49 |
| 27 Dispositions en vue de la mise à la terre .....  | 49 |
| 28 Vis et connexions .....  | 50 |
| 29 Distances dans l'air, lignes de fuite et isolation solide.....   | 50 |
| 30 Résistance à la chaleur et au feu.....   | 50 |
| 31 Protection contre la rouille.....  | 50 |
| 32 Rayonnement, toxicité et dangers analogues.....  | 51 |
| Annexes .....   | 52 |
| Annexe B (normative) Appareils alimentés par batteries, batteries séparables et batteries amovibles pour les appareils alimentés par batteries..... | 53 |
| Annexe R (normative) Évaluation des logiciels.....  | 54 |
| Bibliographie.....  | 55 |
| Figure 101 – Calibre pour le mesurage des températures de surface .....   | 51 |

Tableau 101 – Échauffements maximaux pour les surfaces accessibles extérieures  
spécifiées en conditions de fonctionnement normal.....42

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## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES –  
SÉCURITÉ –**Partie 2-82: Exigences particulières pour les machines de divertissement  
et les machines de service pour les personnes**

## AVANT-PROPOS

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse <https://patents.iec.ch>. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

L'IEC 60335-2-82 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette quatrième édition annule et remplace la troisième édition parue en 2017 et l'Amendement 1:2020. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) le texte a été aligné sur l'IEC 60335-1:2020;
- b) certaines notes ont été converties en texte normatif (Article 1, 19.2, 19.101, 22.104);
- c) le calibre d'essai 18 a été introduit (22.101);
- d) le calibre d'essai 19 a été introduit (8.1.1, 20.2);
- e) les limites d'échauffement des surfaces ont été ajoutées (11.3, 11.8, Tableau 101).

Le texte de cette Norme internationale est issu des documents suivants:

| Projet       | Rapport de vote |
|--------------|-----------------|
| 61/7273/FDIS | 61/7299/RVD     |

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). Les principaux types de documents développés par l'IEC sont décrits plus en détail sous [www.iec.ch/publications](http://www.iec.ch/publications).

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général *Appareils électrodomestiques et analogues – Sécurité*, se trouve sur le site web de l'IEC.

La présente partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements sauf si cette édition l'exclut. Dans ce cas, la dernière édition qui n'exclut pas la présente partie 2 est utilisée. Elle a été établie sur la base de la sixième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60335-1.

La présente partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les machines de divertissement et les machines de service pour les personnes.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette partie 2, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

NOTE 2 Le système de numérotation suivant est utilisé:

- les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101;
- à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés;
- les annexes qui sont ajoutées sont désignées AA, BB, etc.

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

- exigences: caractères romains;
- *modalités d'essais: caractères italiques;*
- notes: petits caractères romains.

Les termes en **gras** dans le texte sont définis à l'Article 3. Lorsqu'une définition concerne un adjectif, l'adjectif et le nom associé figurent également en gras.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous [webstore.iec.ch](http://webstore.iec.ch) dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé, ou
- révisé.

NOTE 4 L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'une nouvelle publication IEC, ou d'une publication amendée ou révisée, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu de cette publication soit adopté pour application nationale (obligatoire) au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

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## INTRODUCTION

Il a été admis par hypothèse, en établissant la présente Norme internationale, que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant une qualification appropriée.

Les documents de recommandations concernant l'application des exigences de sécurité pour les appareils peuvent être consultés dans les documents de support du CE 61, accessibles sur le site web de l'IEC à l'adresse

<https://www.iec.ch/tc61/supportingdocuments>

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et ne constitue nullement un remplacement du texte normatif de la présente norme.

La présente norme reconnaît le niveau de protection internationalement accepté contre les risques électriques, mécaniques, thermiques, liés au feu et au rayonnement des appareils, lorsqu'ils fonctionnent comme en usage normal en tenant compte des instructions du fabricant. Elle couvre également les situations anormales auxquelles on peut s'attendre dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent affecter le fonctionnement sûr des appareils.

La présente norme tient compte autant que possible des exigences de l'IEC 60364, de façon à rester compatible avec les règles d'installation quand l'appareil est raccordé au réseau d'alimentation. Cependant, des règles nationales d'installation peuvent être différentes.

Si un appareil relevant du domaine d'application de la présente norme comporte également des fonctions couvertes par une autre partie 2 de l'IEC 60335, la partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela s'applique, l'influence d'une fonction sur les autres fonctions est prise en compte.

Lorsqu'une partie 2 ne comporte pas d'exigences complémentaires pour couvrir les dangers traités dans la Partie 1, la Partie 1 s'applique.

NOTE 1 Cela signifie que les comités d'études responsables pour les parties 2 ont déterminé qu'il n'était pas nécessaire de spécifier des exigences particulières pour l'appareil en question en plus des exigences générales.

La présente norme est une norme de famille de produits traitant de la sécurité d'appareils et a préséance sur les normes horizontales et génériques couvrant le même sujet.

NOTE 2 Les publications horizontales, les publications fondamentales de sécurité et les publications groupées de sécurité couvrant un danger ne s'appliquent pas, parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335.

Un appareil conforme au texte de la présente norme ne sera pas nécessairement jugé conforme aux principes de sécurité de la norme si, lorsqu'il est examiné et soumis aux essais, il apparaît qu'il présente d'autres caractéristiques qui compromettent le niveau de sécurité visé par ces exigences.

Un appareil utilisant des matériaux ou présentant des modes de construction différents de ceux décrits dans les exigences de la présente norme peut être examiné et soumis aux essais en fonction de l'objectif poursuivi par ces exigences et, s'il est jugé pratiquement équivalent, il peut être estimé conforme aux principes de sécurité de la présente norme.

NOTE 3 Les normes traitant des aspects non relatifs à la sécurité des appareils électrodomestiques sont:

- les normes IEC publiées par le comité d'études 59 concernant les méthodes de mesure d'aptitude à la fonction;
- les normes CISPR 11 et CISPR 14-1, ainsi que les normes applicables de la série IEC 61000-3 concernant les émissions électromagnétiques;
- la norme CISPR 14-2 concernant l'immunité électromagnétique;
- les normes IEC publiées par le comité d'études 111 concernant l'environnement.

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## APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

### Partie 2-82: Exigences particulières pour les machines de divertissement et les machines de service pour les personnes

#### 1 Domaine d'application

L'article de la Partie 1 est remplacé par le texte suivant.

La présente partie de l'IEC 60335 traite de la sécurité des machines de divertissement électriques et des machines électriques de service pour les personnes, à usage commercial, dont la **tension assignée** est inférieure ou égale à 250 V pour les appareils monophasés et à 480 V pour les autres appareils, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**.

La liste suivante répertorie les exemples d'appareils qui relèvent du domaine d'application de la présente norme:

- machines de divertissement:
  - tables de billard;
  - jeux de quilles;
  - fléchettes;
  - simulateurs de conduite;
  - machines de jeu;
  - **animaux ou véhicules animés pour enfants**;
  - jeux à laser;
  - billards électriques;
  - jeux vidéo;
- machines de service pour les personnes:
  - machines à recharger les cartes;
  - distributeurs de monnaie;
  - consignes à bagages;
  - balances;
  - appareils à cirer les chaussures.

Dans la mesure du possible, la présente norme traite des dangers ordinaires présentés par les appareils, encourus par les utilisateurs et les **agents d'entretien**.

L'attention est attirée sur le fait que

- pour les appareils destinés à être utilisés dans des véhicules ou à bord de navires ou d'avions, des exigences supplémentaires peuvent être nécessaires;
- dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux de la santé, par les organismes nationaux responsables de la protection des travailleurs et par des organismes similaires.

La présente norme ne s'applique pas

- aux appareils prévus exclusivement pour des usages domestiques;
- aux appareils prévus exclusivement pour des usages industriels;
- aux appareils destinés à être utilisés dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz);
- aux appareils de lavage des voitures;
- aux distributeurs avec ou sans moyen de paiement (IEC 60335-2-75);
- aux appareils qui entrent dans le domaine d'application de l'IEC 62368-1, tels que les juke-boxes, les jeux vidéo à usage domestique, les machines à photocopier, les distributeurs de tickets et les distributeurs de billets;
- aux appareils destinés à être utilisés en présence d'un surveillant formé, tels que les systèmes de réalité virtuelle;
- aux équipements destinés à être utilisés exclusivement dans des foires, tels que les manèges;
- aux dispositifs de transport personnel autoéquilibrés (IEC 60335-2-114).

## 2 Références normatives

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

*Addition:*

IEC 60065:2001<sup>1</sup>, *Appareils audio, vidéo et appareils électroniques analogues – Exigences de sécurité*

IEC 60065:2001/AMD1:2005

IEC 60065:2001/AMD2:2010

IEC 60068-2-52, *Essai d'environnement – Partie 2: Essais – Essai Kb: Brouillard salin, essai cyclique (solution de chlorure de sodium)*

IEC 62368-1 *Équipements des technologies de l'audio/vidéo, de l'information et de la communication – Partie 1: Exigences de sécurité*

## 3 Termes et Définitions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

### 3.1 Définitions relatives aux caractéristiques physiques

#### 3.1.9 *Modification:*

#### **fonctionnement normal**

Remplacer le premier alinéa par ce qui suit:

fonctionnement de l'appareil dans les conditions suivantes:

L'appareil est mis en fonctionnement en **mode prêt** jusqu'à l'établissement des conditions de régime, puis suivant les conditions de fonctionnement les plus défavorables rencontrées en usage normal.

---

<sup>1</sup> Il existe une édition consolidée 7.2 (2010) qui comprend l'édition 7 et ses Amendements 1 et 2. Cette publication a été supprimée.

L'appareil est réapprovisionné, lorsque cela est nécessaire, conformément aux instructions d'emploi ou aux **instructions d'entretien**, et la période de fonctionnement suivante est commencée dès que possible.

Les charges suivantes sont placées sur les appareils qui, en usage normal, portent des personnes:

- sur les **animaux ou véhicules animés pour enfants**, 50 kg par place ou siège;
- pour les autres appareils, 100 kg pour la première place et 75 kg pour chaque place ou siège supplémentaire.

Note 101 à l'article: Le siège ou la place peut convenir à une personne assise ou debout.

Si les instructions indiquent que des charges plus élevées sont admises, l'appareil est chargé en conséquence.

Les amplificateurs audio sont mis en fonctionnement conformément aux conditions normales de fonctionnement spécifiées dans l'IEC 62368:1.

### 3.5 Définitions relatives aux types d'appareils

#### 3.5.101

##### **animal ou véhicule animé pour enfants**

appareil mobile à base fixe, destiné à être utilisé par un ou deux enfants âgés de trois à dix ans, sous la surveillance d'un adulte

### 3.6 Définitions relatives aux parties d'un appareil

#### 3.6.2 *Remplacement:*

##### **partie amovible**

partie qui peut être enlevée sans l'aide d'un **outil**, partie qui est enlevée conformément aux instructions d'emploi ou aux **instructions d'entretien**, même si un **outil** ou une **clé d'accès** est nécessaire pour l'enlever, ou partie qui ne satisfait pas à l'essai du 22.11

Note 1 à l'article: Si, pour effectuer l'installation, une partie doit être enlevée, cette partie n'est pas considérée comme étant amovible, même si les instructions indiquent qu'elle doit être enlevée.

Note 2 à l'article: Une partie qui peut être ouverte est considérée comme une partie qui peut être enlevée.

#### 3.6.101

##### **clé d'accès**

clé ou autre moyen qui donne accès à la **zone d'entretien**, mais qui ne donne pas accès à la **zone de service**

Note 1 à l'article: Un **outil** ou un fonctionnement par codes ou signaux produits par des sources optiques ou électromagnétiques constitue un "autre moyen".

#### 3.6.102

##### **clé de déverrouillage**

clé ou autre moyen utilisé pour rendre un verrouillage inopérant

#### 3.6.103

##### **zone utilisateur**

zone dont l'accès est obtenu sans l'utilisation d'une **clé d'accès** ou d'un **outil**

#### 3.6.104

##### **zone d'entretien**

zone dont l'accès ne peut être obtenu qu'au moyen d'une **clé d'accès**

**3.6.105****zone de service**

zone dont l'accès ne peut pas être obtenu au moyen d'une **clé d'accès**

**3.7 Définitions relatives aux composants de sécurité****3.7.3 Remplacement:****coupe-circuit thermique**

dispositif qui, en fonctionnement anormal, limite la température de la partie commandée par l'ouverture automatique du circuit ou par réduction du courant, et qui est construit de façon telle que son réglage ne puisse pas être modifié par l'utilisateur ou par l'**agent d'entretien**

**3.8 Définitions relatives à des sujets divers****3.8.5 Remplacement:****opération d'entretien**

opération prévue pour être effectuée par l'utilisateur ou l'**agent d'entretien**, suivant les indications marquées sur l'appareil ou selon les instructions d'emploi ou les **instructions d'entretien**

Note 1 à l'article: Les **instructions d'entretien** marquées sur l'appareil, ou fournies avec l'appareil ou ultérieurement, ne s'appliquent que dans la **zone utilisateur** et la **zone d'entretien**.

Note 2 à l'article: Les **opérations d'entretien** incluent la préparation et la mise en état de l'appareil pour de nouveaux modes de fonctionnement. Elles ne comprennent pas les opérations qui doivent être effectuées dans la **zone de service**.

**3.8.101****instructions d'entretien**

instructions qui expliquent comment effectuer le nettoyage, la recharge, la collecte des pièces de monnaie, le réglage des dispositifs de commande et autres opérations similaires

**3.8.102****agent d'entretien**

personne qui entretient l'appareil conformément aux **instructions d'entretien**

**3.8.103****mode prêt**

état de l'appareil prêt pour l'utilisation, mis sous tension et rempli conformément aux instructions, mais les réceptacles à monnaie étant vides

**4 Exigences générales**

L'article de la Partie 1 s'applique.

**5 Conditions générales d'essais**

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

**5.6 Remplacement:**

*Les dispositifs de commande ou dispositifs de coupure de la **zone utilisateur** sont réglés sur la position la plus défavorable.*

*Les dispositifs de commande, les dispositifs de coupure, ou les autres parties, situés dans la **zone d'entretien** sont réglés sur la position la plus défavorable dans les limites indiquées dans les **instructions d'entretien**; toutefois, les dispositifs de commande ou les dispositifs de coupure situés dans la **zone de service** ne sont pas réglés.*

### 5.9 Addition:

Lorsque des logiciels en option sont prévus par le fabricant de l'appareil, l'appareil est soumis à l'essai avec le logiciel qui donne les résultats les plus défavorables.

**5.101** Les exigences de la présente norme pour la **zone d'entretien** s'appliquent lorsque les **instructions d'entretien** sont suivies. Si une **clé de déverrouillage** pour accès à la **zone d'entretien** est fournie, celle-ci est utilisée avant l'exécution d'un essai, si cette condition est plus défavorable.

**5.102** Les appareils qui comportent des transformateurs, des **circuits électroniques** et des lampes sont soumis aux essais comme des **appareils à moteur**, à moins qu'ils ne comportent un élément chauffant, auquel cas ils sont soumis aux essais comme des **appareils combinés**.

## 6 Classification

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

### 6.1 Modification:

Remplacer le premier alinéa par ce qui suit:

Les appareils doivent être de la **classe I**, de la **classe II** ou de la **classe III**.

### 6.2 Addition:

Les appareils destinés à être utilisés à l'extérieur doivent être au moins classés IPX4.

Les appareils qui sont prévus pour être nettoyés au jet d'eau ou installés dans un endroit où un jet d'eau est susceptible d'être utilisé doivent être au moins classés IPX5.

Les appareils qui, en usage normal, utilisent un jet d'eau, doivent être au moins classés IPX5, à moins que le jet d'eau ne puisse pas être dirigé sur l'enveloppe des parties électriques, auquel cas l'appareil peut être classé IPX4.

## 7 Marquage et instructions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

### 7.1 Addition:

Pour les appareils qui comportent un socle de prise de courant, la tension, la nature de l'alimentation et le courant ou la puissance de sortie doivent être marqués à proximité du socle de prise de courant.

### 7.3 Addition:

L'exigence s'applique également lorsque le réglage doit être effectué par l'**agent d'entretien**.

### 7.12 Modification:

Les instructions concernant les personnes (y compris les enfants) dont les capacités physiques, sensorielles ou mentales sont réduites, les personnes dénuées d'expérience ou de connaissance, et l'utilisation de l'appareil comme jouet par des enfants ne s'appliquent pas.

### 7.12.1 *Addition:*

Les instructions d'installation doivent indiquer si l'appareil est adapté à une utilisation à l'extérieur.

Pour les appareils qui ne sont pas au moins classés IPX5, les instructions d'installation doivent indiquer que l'appareil n'est pas adapté à une installation dans un endroit où un jet d'eau est susceptible d'être utilisé.

Les instructions d'installation des appareils porteurs mobiles doivent indiquer l'espace libre nécessaire autour de l'appareil pour un fonctionnement en toute sécurité.

Les instructions d'installation des **animaux ou véhicules animés pour enfants** doivent indiquer que l'installation d'un dispositif à courant différentiel résiduel (DDR), de courant différentiel de fonctionnement assigné inférieur ou égal à 30 mA, est conseillée.

**7.12.101** S'il est nécessaire de prendre des précautions spéciales au cours des **opérations d'entretien**, les détails correspondants doivent être fournis. Les **instructions d'entretien** doivent indiquer comment accéder à la **zone d'entretien**. Elles ne doivent pas comporter d'instructions sur la façon d'accéder à la **zone de service**.

*La vérification est effectuée par examen.*

**7.12.101.1** Les **instructions d'entretien** des appareils qui sont équipés d'un socle de connecteur et qui sont destinés à être partiellement ou complètement immergés dans l'eau pour le nettoyage doivent indiquer que la prise mobile de connecteur doit être débranchée avant de nettoyer l'appareil et que le socle de connecteur doit être séché avant une nouvelle utilisation de l'appareil.

Si l'appareil n'est pas au moins classé IPX5, les **instructions d'entretien** doivent indiquer que l'appareil ne doit pas être nettoyé au jet d'eau.

*La vérification est effectuée par examen.*

**7.12.101.2** Si l'utilisation d'une **clé de déverrouillage** permet l'accès aux parties mobiles, un avertissement approprié doit être fourni dans les **instructions d'entretien**.

*La vérification est effectuée par examen.*

**7.12.101.3** Les **instructions d'entretien** doivent énumérer tous les accessoires qui peuvent être utilisés avec l'appareil.

*La vérification est effectuée par examen.*

**7.12.101.4** Pour les appareils qui utilisent de l'eau, les **instructions d'entretien** doivent donner des détails sur la façon d'éviter le gel ou d'assurer un fonctionnement en toute sécurité en cas de gel.

*La vérification est effectuée par examen.*