# IEC 60335-2-84

Edition 3.0 2019-10
REDLINE VERSION

# INTERNATIONAL STANDARD



colour inside

## Household and similar electrical appliances – Safety – Part 2-84: Particular requirements for toilets appliances

IEC 60335-2-84:2019-10 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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## Household and similar electrical appliances – Safety – Part 2-84: Particular requirements for toilets appliances

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

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## 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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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights. International Standard IEC 60335-2-84 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

**This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.**

This third edition cancels and replaces the second edition published in 2002, Amendment 1:2008 and Amendment 2:2013. This edition constitutes a technical revision.

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

– definitions have been renumbered (Clause 3);
– requirements for installation instructions have been updated to reflect the option in 7.101 of the label being placed on the appliance (7.12.1);
– some notes have been converted to normative text (7.101, 22.103, 27.1, 31);
– requirements have been added for appliances that have programmable electronic circuits that limit the number of heating elements and motors from being energized at the same time (22.105, Annex R).

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

| CDV | Report on voting |
|---|---|
| 61/5749/CDV | 61/5846B/RVC |

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

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

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) 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: Safety requirements for toilet appliances.

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 publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may 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.

The following differences exist in the countries indicated below.

– 3.1.9: Normal operation is different (USA);

– 6.2: Toilets, spray seats and heated seats are allowed to be IPX3（Japan);

– 22.103: The test is different (USA).

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

# INTRODUCTION

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.

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 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 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.

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.

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 2-84: Particular requirements for toilet~~s~~ appliances

## 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric toilet~~s~~ appliances having a rated voltage being not more than 250 V, in which excrement is stored, dried or destructed~~, their **rated voltage** being not more than 250 V~~ or which wash or dry parts of the human body.

NOTE 101 Examples of such electric toilets ~~may~~ are the following and they can be used to process garbage such as paper and food waste.

– **mouldering toilets**;
– **package toilets**;
– **freezing toilets**;
– **vacuum toilets**.

This standard also applies to electric equipment for use with conventional toilets.

NOTE 102 Examples of such electric equipment are

– automatic seat covering devices;
– chopping units;
– heated seats;
– pumping units;
– water heaters for ~~**shower units**~~ **spray seats**;
– spray seats.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account young children playing with the appliance.

NOTE 103 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 health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 104 This standard does not apply to

– 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);
– chemical toilets;
– toilets in which excrement is destructed by combustion.

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

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

IEC 60068-2-52:1996[1], *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

## 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:*

**normal operation**
operation of the appliance under the following conditions:

Appliances are operated in cycles, each cycle being initiated every 10 min, bowl covers being open or closed, whichever is more unfavourable. If the cycle is not automatically terminated, the appliance is operated for 15 s, or for the period specified in the instructions, whichever is longer.

For **spray seats**, if the cycle is not automatically terminated, the appliance is operated for 30 s. If the cycle is automatically terminated, the appliance is operated for 30 s or automatic operation time, whichever is shorter.

If warm air is provided for drying and if the cycle is not automatically terminated, the appliance is operated for 1 min. If the cycle is automatically terminated, the appliance is operated for 1 min or automatically terminating time, whichever is shorter.

If warm air is provided for drying, the drying cycle is initiated immediately after the end of the showering cycle, unless the sequence is automatic.

The excrement tank of **mouldering toilets** is empty or filled with peat, whichever is more unfavourable.

**Package toilets** are provided with bags.

For **freezing toilets**, 0,3 l of water having a temperature of 37 °C is added each cycle, controls being adjusted to the lowest temperature. They are also operated without water.

~~**Shower units**~~ **Spray seats** are supplied with water at the most unfavourable pressure that provides an effective spray.

### 3.5 Definitions relating to types of appliances

**3.5.101**
**mouldering toilet**
appliance in which excrement is processed by drying



[1] This 2nd edition was replaced in 2017 by a 3rd Edition IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)* but the listed edition applies.

**3.5.102**
**package toilet**
appliance in which excrement is packed in bags and stored in a tank

**3.5.103**
**freezing toilet**
appliance in which excrement is frozen and stored in a tank

**3.5.104**
**vacuum toilet**
appliance in which excrement is evacuated to a storage tank by negative pressure

~~**3.105**~~
~~**shower unit**~~
~~device incorporated in the appliance that sprays water for cleaning parts of the human body~~

~~NOTE **Shower units** may subsequently supply warm air for drying. The units may be incorporated in the seat or bowl.~~

**3.5.105**
**spray seat**
appliance that sprays water for cleaning parts of the human body

Note 1 to entry: **Spray seats** can have functions such as heating the seat, drying, deodorizing or automatically opening/closing the seat and the bowl cover.

Note 2 to entry: **Spray seats** can be integrated with a toilet.

## 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.

**5.2** *Addition:*

*The tests of 31.101 are not carried out on a separate appliance.*

**5.3** *Addition:*

*The tests of 31.101 are carried out before the test of Clause 8.*

**5.7** *Addition:*

*The temperature of the water used for the tests is 15 °C ± 5 °C.*

## 6 Classification

This clause of Part 1 is applicable except as follows.

**6.1** *Modification:*

Appliances incorporating water heaters having bare heating elements shall be **class I** or **class III**.

**Spray seats** shall be **class I, class II**, or **class III**.

**6.2** *Addition:*

Toilets, **spray seats** and heated seats shall be at least IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

**7.12** *Addition:*

The instructions shall state how to empty and clean the toilet safely. They shall include details about the final disposal of the excrement or its residue, unless the toilet is connected to the sewage system.

*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 for **class 0I appliances** and **class I appliances** shall state that they have to be earthed.

The installation instructions for appliances incorporating water heaters having bare heating elements shall state the substance of the following:

– the resistivity of the water supply must not be less than .... Ωcm;
– the appliance must be permanently connected to fixed wiring.

~~The installation instructions shall state~~

~~– the maximum permissible inlet water pressure, in megapascals, for appliances intended to be connected to the water mains;~~

~~– the minimum permissible inlet water pressure, in megapascals, if this is necessary for the correct operation of the appliance.~~

~~The installation instructions shall state that the label concerning glowing cigarettes is to be fixed in a conspicuous place beside the toilet (except flushing toilets).~~

The installation instructions for toilets, except for flushing toilets, shall state that the label concerning glowing cigarettes is to be fixed in a conspicuous place beside or on the toilet.

**7.101** Toilets, except flushing toilets, shall be provided with a label stating that glowing cigarettes and other burning materials must not be thrown into the toilet.

The label shall be suitable for permanent fixing.

~~NOTE~~ The label may be fixed on the appliance if it is visible before using the toilet.

*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:*

*Test probe 18 of IEC 61032 is also applied, as specified for test probe B.*

**8.2** *Addition:*

*Test probe 18 of IEC 61032 is also applied, as specified for test probe B.*

## 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.

**11.3** *Addition:*

*Thermocouples attached to the small blackened disks are also used for measuring the temperature rise of warm air.*

**11.7** *Replacement:*

***~~Shower units~~ Spray seats*** *are operated for 2 min unless the water flow stops automatically. Other appliances are operated until steady conditions are established.*

**11.8** *Addition:*

*The temperature rises shall not exceed the values shown in Table 101.*

**Table 101 – Maximum normal temperature rises**

| ~~Part~~ | ~~Temperature rise K~~ |
|---|---|
| ~~Surfaces likely to be in contact with the skin:~~ | |
| ~~– if of metal~~ | ~~15~~ |
| ~~– if of other material~~ | ~~25~~ |
| ~~Warm air for drying parts of the human body~~ | ~~40~~ [a] |
| ~~Surfaces outside the bowl located within 250 mm of the seat~~ | ~~30~~ |
| ~~Interior of the excrement tank of **mouldering toilets**~~ | ~~60~~ |
| ~~Ducts through which excrement passes~~ | ~~60~~ |
| [a] ~~The air temperature is measured 50 mm from the air outlet.~~ | |

| *Part* | *Temperature rise K* |
|---|---|
| *Surfaces likely to be in contact with the skin* | *23* |
| *Warm air for drying parts of the human body* | *40* [a] |
| *Surfaces outside the bowl located within 250 mm of the seat* | *30* |
| *Interior of the excrement tank of **mouldering toilets*** | *60* |
| *Ducts through which excrement passes* | *60* |
| [a] *The air temperature is measured 50 mm from the air outlet.* | |

*The temperature of the water supplied by ~~**shower units**~~ **spray seats** shall not exceed 45 °C.*

## 12 Void

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

**13.2** *Addition:*

*Water heaters having bare heating elements are tested with water having the resistivity stated in the instructions.*

NOTE 101 The appropriate resistivity ~~may~~ can be obtained by adding ammonium phosphate to the water.

*For water heaters of **class I** having bare heating elements, the leakage current is measured between a metal sieve positioned 10 mm from the spray head of the ~~**shower unit**~~ **spray seat** and the earthing terminal. The terminals of the heating element are connected through the selector switch to each pole of the supply in turn, as shown in Figure 101.*

*The leakage current shall not exceed 0,25 mA.*

## 14 Transient overvoltages

This clause of Part 1 is applicable.

## 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

**15.1.1** *Addition:*

*It may be necessary to use the spray nozzle described in 14.2.4 b) of IEC 60529 for testing the inside of the bowl.*

## 16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

**16.2** *Addition:*

*Water heaters having bare heating elements are tested with water having the resistivity stated in the instructions.*

## 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 incorporating automatic controls are also subjected to the test of 19.101.*

**19.2** *Addition:*

*Water heaters are tested with or without water, whichever is more unfavourable.*

**19.13** *Addition:*

*The temperature rises shall not exceed the values shown in Table 102.*

**Table 102 – Maximum abnormal temperature rises**

| ~~Part~~ | ~~Temperature rise K~~ |
|---|---|
| ~~Surfaces likely to be in contact with the skin:~~ | |
| ~~– if of metal~~ | ~~25~~ |
| ~~– if of other material~~ | ~~55~~ |
| ~~Warm air for drying parts of the human body~~ | ~~65 [a]~~ |
| ~~Surfaces outside the bowl located within 250 mm of the seat~~ | ~~40~~ |
| ~~Interior of the excrement tank of **mouldering toilets**~~ | ~~100~~ |
| ~~Ducts through which excrement passes~~ | ~~100~~ |
| ~~[a] The air temperature is measured 50 mm from the air outlet.~~ | |

| *Part* | *Temperature rise K* |
|---|---|
| *Surfaces likely to be in contact with the skin:* | |
| *– if of metal* | *36* |
| *– if of other material* | *55* |
| *Warm air for drying parts of the human body* | *65* [a] |
| *Surfaces outside the bowl located within 250 mm of the seat* | *40* |
| *Interior of the excrement tank of **mouldering toilets*** | *100* |
| *Ducts through which excrement passes* | *100* |
| [a] *The air temperature is measured 50 mm from the air outlet.* | |

*The temperature of the water supplied by ~~**shower units**~~ **spray seats** shall not exceed 65 °C.*

**19.101** *The appliance is supplied at **rated voltage** and operated under **normal operation**. Any fault conditions that can be expected in normal use are applied one at a time.*

NOTE Examples of fault conditions are

– failure of **thermostats**;
– failure of relays;
– open-circuiting or short-circuiting of components;
– stopping programmers in any position.

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable.

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

**21.1** *Addition:*

*Compliance is also checked by the tests of 21.101 and 21.102.*

**21.101** *The appliance is subjected to an evenly distributed force of 1 500 N applied perpendicularly to the seat, the bowl cover being open for 10 min.*

*The test is repeated with the bowl cover closed.*

*A force of ~~250~~ 150 N is then applied for 5 s to the front edge of the bowl cover or seat in a right or left direction parallel to the hinges, whichever is more unfavourable. Then the bowl cover or seat ~~being~~ is slowly raised and lowered. The test is carried out five times.*

*The bowl cover or seat is then raised and the force of ~~250~~ 150 N is applied for 1 min to its front edge in a direction perpendicular to its plane. For **spray seats** and heated seats that are installed onto the toilet bowl or integrated with the toilet bowl, the force of 150 N is applied, and the bowl cover is lifted to less than an angle of 120°. If detachable parts are removed, no more force is applied.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3, 27.5 and Clause 29 is impaired.*

**21.102** *The excrement tank is completely filled with water and the appliance placed in a room having a temperature of approximately –15 °C. When the water is completely frozen, the appliance is allowed to warm up until the ice has melted. The test is carried out three times.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3 and 27.5 is impaired.*

**21.103** **Spray seats**, heated seats, enclosures and seats shall have adequate mechanical strength and be constructed to withstand repeated mechanical stresses that may be expected to occur during normal use.

*Compliance is checked by the tests of 21.103.1 and 21.103.2.*

**21.103.1** *The appliance is subjected to an evenly distributed force of 1 250 N applied perpendicularly to the seat for 4 s by a rubber disc having a thickness of 10 mm, a diameter of 300 mm and a shore A hardness of 70°, with a steel disc having a thickness of 5 mm and a diameter of 300 mm attached on its upper surface. The test is carried out 20 000 times.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3, 27.5 and Clause 29 is impaired.*

**21.103.2** *The appliance is subjected to an evenly distributed force of 890 N applied perpendicularly on each side of the seat for 1 s with a 0,5 s interval by a rubber disc having a thickness of 19 mm, a diameter of 76 mm and a shore A hardness of 70°. The test is carried out 10 000 cycles. One cycle consists of applying the force to one side and the other.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3, 27.5 and Clause 29 is impaired.*

## 22 Construction

This clause of Part 1 is applicable except as follows.

**22.2** *Modification:*

**Class I appliances** shall not incorporate an appliance inlet.

**22.24** *Replacement:*

Appliances shall not incorporate bare heating elements located in excrement tanks or as water heaters for **spray seats**.

*Compliance is checked by inspection.*

**22.33** *Modification:*

Liquids may be in direct contact with **live parts** of bare heating elements and may be heated using electrodes.

**22.48** *Addition:*

If a dynamic backflow preventer is used, the critical level shall be located not less than 25 mm above the fixture rim flood level.

**22.101** Toilets shall be **fixed appliances**.

*Compliance is checked by inspection.*

**22.102** Metal parts in contact with skin and which support the body in normal use shall ~~not be earthed~~ be of **class II construction**.

This requirement does not apply if the metal parts in contact with skin and which support the body in normal use are earthed and permanently connected to the fixed wiring.

*Compliance is checked by inspection and, if necessary, by the relevant tests.*

**22.103** Appliances shall be constructed so that **live parts** are protected from exposure to excrement.

*Compliance is checked by inspection and, if rubber seals are used, by the following test.*

*The seal is immersed for 24 h in mineral oil having a temperature of 100 °C ± 2 °C. After the test, the volume of the seal shall not have increased by more than 50 %.*

~~*NOTE*~~ *The oil ~~has~~ shall have the following properties:*

– *aniline point, 93 °C ± 3 °C;*
– *viscosity, (20 ± 1) cSt at 100 °C;*
– *flash point, 245 °C ± 6 °C.*

**22.104** **Vacuum toilets** shall be constructed so that they cannot be flushed unless the bowl cover is closed.

*Compliance is checked by manual test.*

**22.105** ~~Appliances shall withstand the water pressure expected in normal use.~~

~~*Compliance is checked by connecting the appliance to a water supply having a pressure equal to twice the maximum permissible inlet water pressure or 1,2 MPa, whichever is higher, for a period of 5 min.*~~

~~*There shall be no leakage.*~~

For appliances that are controlled by **programmable electronic circuits** that limit the number of heating elements and motors from being energized 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 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:*

*For heated seats, the number of flexings is 50 000.*

**23.5** *Addition:*

Internal wiring supplying parts in the excrement tank at **safety extra-low voltage** shall not be lighter than ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53).

## 24 Components

This clause of Part 1 is applicable except as follows.

**24.101 Thermal cut-outs** incorporated in appliances for compliance with 19.4 or 19.101 shall not be self-resetting. This requirement is not applicable to **spray seats** when a thermal link for compliance with 19.13 is connected in series with a **thermal cut-out** with an operating temperature not exceeding 65 °C, in 19.13.

*Compliance is checked by inspection.*

## 25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

**25.3** *Addition:*

Appliances incorporating water heaters having bare heating elements shall only be provided with means for connection to fixed wiring.

## 26 Terminals for external conductors

This clause of Part 1 is applicable.

## 27 Provision for earthing

This clause of Part 1 is applicable except as follows.

**27.1** *Addition:*

For **class I appliances** incorporating water heaters having bare heating elements, the water shall enter and leave through metal pipes that are permanently and reliably connected to the earthing terminal or flow over metal parts that are similarly earthed.

~~NOTE 102~~ Parts that are liable to be in contact with excrement are considered to be accessible.

NOTE 101 Examples of such metal parts are grids or rings.

## 28 Screws and connections

This clause of Part 1 is applicable.

## 29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

**29.2** *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

## 30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

**30.2.2** Not applicable.

**30.2.3.1** *Modification:*

*The specified glow-wire flammability index is not applicable to water heaters having bare heating elements.*

**30.2.3.2** *Modification:*

*For water heaters having bare heating elements, the glow-wire test is carried out as specified for other connections.*

**30.101** The bowl shall not incorporate combustible material.

*Compliance is checked by subjecting non-metallic material to the needle-flame test of Annex E.*

*The test is not carried out if the material is classified as V-0 according to IEC 60695-11-10, provided that the test sample was no thicker than the relevant part.*

## 31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

*Addition:*

*Compliance is checked by the salt mist test of IEC 60068-2-52, severity 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.*

*During the test, metal parts that may be contacted by excrement shall be exposed to the salt mist.*

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

~~NOTE 101 It has to be ensured that metal parts in contact with excrement are exposed to the salt mist.~~

**31.101** Toilet appliances shall have adequate resistance to cleaners and urine.

*Compliance is checked by the following tests.*

*The following tests are separately applied to appliances unless electrical parts are enclosed or located so that they are unlikely to be exposed to the pollution atmosphere.*

*The appliance is kept for 96 h in a 0,055 % ± 0,005 % intensity by volume ammoniac atmosphere at room pressure.*

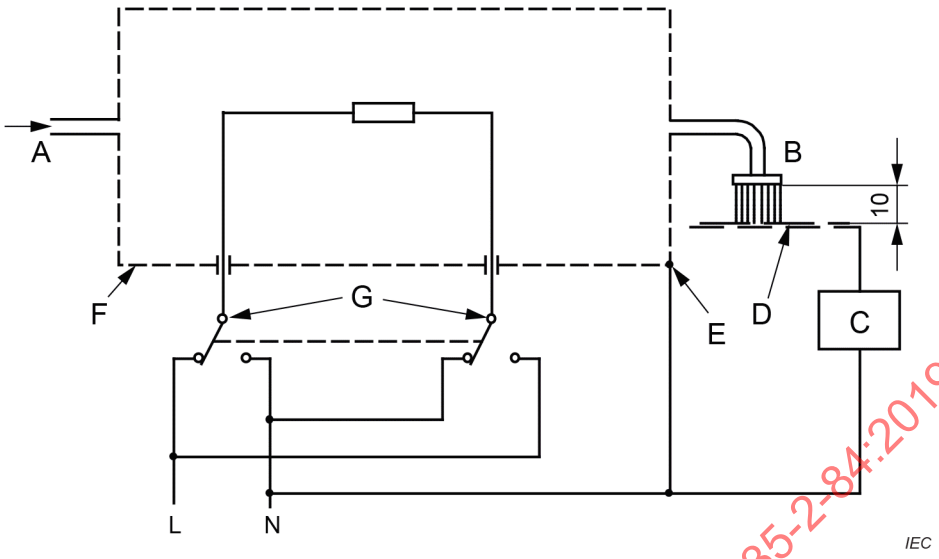
*The appliance is then kept for 96 h in a 0,000 5 % ± 0,000 2 % intensity by volume hydrochloric acid atmosphere at room pressure.*

*The appliance shall show no damage that could impair compliance with this standard.*

## 32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Dimension in millimetres




**Key**

A inlet pipe
B spray head
C circuit of Figure 4 of IEC 60990:1999
D metal sieve
E earthing terminal
F body of the water heater
G selector switch

**Figure 101 – Diagram for leakage current measurement for water heaters having bare heating elements**

## Annexes

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

## Annex R
(normative)

## Software evaluation

**R.2.2.5** *Modification:*

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

**R.2.2.9** *Modification:*

The software and safety-related hardware under its control shall be initialized and shall terminate before compliance with Clause 19 and 22.105 is impaired.

## Bibliography

The bibliography of Part 1 is applicable.

# IEC 60335-2-84

Edition 3.0 2019-10

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Household and similar electrical appliances – Safety –**
**Part 2-84: Particular requirements for toilet appliances**

**Appareils électrodomestiques et analogues – Sécurité –**
**Partie 2-84: Exigences particulières pour les appareils de toilettes**

IEC 60335-2-84:2019-10(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 2-84: Particular requirements for toilet appliances

## 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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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights. International Standard IEC 60335-2-84 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 2002, Amendment 1:2008 and Amendment 2:2013. This edition constitutes a technical revision.

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

– definitions have been renumbered (Clause 3);
– requirements for installation instructions have been updated to reflect the option in 7.101 of the label being placed on the appliance (7.12.1);
– some notes have been converted to normative text (7.101, 22.103, 27.1, 31);
– requirements have been added for appliances that have programmable electronic circuits that limit the number of heating elements and motors from being energized at the same time (22.105, Annex R).

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

| CDV | Report on voting |
|---|---|
| 61/5749/CDV | 61/5846B/RVC |

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

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

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) 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: Safety requirements for toilet appliances.

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 publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may 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.

The following differences exist in the countries indicated below.

– 3.1.9: Normal operation is different (USA);
– 6.2: Toilets, spray seats and heated seats are allowed to be IPX3（Japan);
– 22.103: The test is different (USA).

# 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.

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 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 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.

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.

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 2-84: Particular requirements for toilet appliances

## 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric toilet appliances having a rated voltage being not more than 250 V, in which excrement is stored, dried or destructed or which wash or dry parts of the human body.

NOTE 101 Examples of such electric toilets are the following and they can be used to process garbage such as paper and food waste.

– **mouldering toilets**;
– **package toilets**;
– **freezing toilets**;
– **vacuum toilets**.

This standard also applies to electric equipment for use with conventional toilets.

NOTE 102 Examples of such electric equipment are

– automatic seat covering devices;
– chopping units;
– heated seats;
– pumping units;
– water heaters for **spray seats**;
– spray seats.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account young children playing with the appliance.

NOTE 103 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 health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 104 This standard does not apply to

– 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);
– chemical toilets;
– toilets in which excrement is destructed by combustion.

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60068-2-52:1996[1], *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

## 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:*

**normal operation**
operation of the appliance under the following conditions:

Appliances are operated in cycles, each cycle being initiated every 10 min, bowl covers being open or closed, whichever is more unfavourable. If the cycle is not automatically terminated, the appliance is operated for 15 s, or for the period specified in the instructions, whichever is longer.

For **spray seats**, if the cycle is not automatically terminated, the appliance is operated for 30 s. If the cycle is automatically terminated, the appliance is operated for 30 s or automatic operation time, whichever is shorter.

If warm air is provided for drying and if the cycle is not automatically terminated, the appliance is operated for 1 min. If the cycle is automatically terminated, the appliance is operated for 1 min or automatically terminating time, whichever is shorter.

If warm air is provided for drying, the drying cycle is initiated immediately after the end of the showering cycle, unless the sequence is automatic.

The excrement tank of **mouldering toilets** is empty or filled with peat, whichever is more unfavourable.

**Package toilets** are provided with bags.

For **freezing toilets**, 0,3 l of water having a temperature of 37 °C is added each cycle, controls being adjusted to the lowest temperature. They are also operated without water.

**Spray seats** are supplied with water at the most unfavourable pressure that provides an effective spray.

### 3.5 Definitions relating to types of appliances

**3.5.101**
**mouldering toilet**
appliance in which excrement is processed by drying

**3.5.102**
**package toilet**
appliance in which excrement is packed in bags and stored in a tank



[1] This 2nd edition was replaced in 2017 by a 3rd Edition IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)* but the listed edition applies.

**3.5.103**
**freezing toilet**
appliance in which excrement is frozen and stored in a tank

**3.5.104**
**vacuum toilet**
appliance in which excrement is evacuated to a storage tank by negative pressure

**3.5.105**
**spray seat**
appliance that sprays water for cleaning parts of the human body

Note 1 to entry: **Spray seats** can have functions such as heating the seat, drying, deodorizing or automatically opening/closing the seat and the bowl cover.

Note 2 to entry: **Spray seats** can be integrated with a toilet.

## 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.

**5.2** *Addition:*

*The tests of 31.101 are not carried out on a separate appliance.*

**5.3** *Addition:*

*The tests of 31.101 are carried out before the test of Clause 8.*

**5.7** *Addition:*

*The temperature of the water used for the tests is 15 °C ± 5 °C.*

## 6 Classification

This clause of Part 1 is applicable except as follows.

**6.1** *Modification:*

Appliances incorporating water heaters having bare heating elements shall be **class I** or **class III**.

**Spray seats** shall be **class I, class II**, or **class III**.

**6.2** *Addition:*

Toilets, **spray seats** and heated seats shall be at least IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

**7.12** *Addition:*

The instructions shall state how to empty and clean the toilet safely. They shall include details about the final disposal of the excrement or its residue, unless the toilet is connected to the sewage system.

*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 for **class 0I appliances** and **class I appliances** shall state that they have to be earthed.

The installation instructions for appliances incorporating water heaters having bare heating elements shall state the substance of the following:

– the resistivity of the water supply must not be less than …. Ωcm;
– the appliance must be permanently connected to fixed wiring.

The installation instructions for toilets, except for flushing toilets, shall state that the label concerning glowing cigarettes is to be fixed in a conspicuous place beside or on the toilet.

**7.101** Toilets, except flushing toilets, shall be provided with a label stating that glowing cigarettes and other burning materials must not be thrown into the toilet.

The label shall be suitable for permanent fixing.

The label may be fixed on the appliance if it is visible before using the toilet.

*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:*

*Test probe 18 of IEC 61032 is also applied, as specified for test probe B.*

**8.2** *Addition:*

*Test probe 18 of IEC 61032 is also applied, as specified for test probe B.*

## 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.

**11.3** *Addition:*

*Thermocouples attached to the small blackened disks are also used for measuring the temperature rise of warm air.*

**11.7** *Replacement:*

***Spray seats** are operated for 2 min unless the water flow stops automatically. Other appliances are operated until steady conditions are established.*

**11.8** *Addition:*

*The temperature rises shall not exceed the values shown in Table 101.*

**Table 101 – Maximum normal temperature rises**

| ***Part*** | ***Temperature rise*** *K* |
|---|---|
| *Surfaces likely to be in contact with the skin* | *23* |
| *Warm air for drying parts of the human body* | *40* [a] |
| *Surfaces outside the bowl located within 250 mm of the seat* | *30* |
| *Interior of the excrement tank of **mouldering toilets*** | *60* |
| *Ducts through which excrement passes* | *60* |
| [a] *The air temperature is measured 50 mm from the air outlet.* | |

*The temperature of the water supplied by **spray seats** shall not exceed 45 °C.*

## 12 Void

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

**13.2** *Addition:*

*Water heaters having bare heating elements are tested with water having the resistivity stated in the instructions.*

NOTE 101 The appropriate resistivity can be obtained by adding ammonium phosphate to the water.

*For water heaters of **class I** having bare heating elements, the leakage current is measured between a metal sieve positioned 10 mm from the spray head of the **spray seat** and the earthing terminal. The terminals of the heating element are connected through the selector switch to each pole of the supply in turn, as shown in Figure 101.*

*The leakage current shall not exceed 0,25 mA.*

## 14 Transient overvoltages

This clause of Part 1 is applicable.

## 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

**15.1.1** *Addition:*

*It may be necessary to use the spray nozzle described in 14.2.4 b) of IEC 60529 for testing the inside of the bowl.*

## 16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

**16.2** *Addition:*

*Water heaters having bare heating elements are tested with water having the resistivity stated in the instructions.*

## 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 incorporating automatic controls are also subjected to the test of 19.101.*

**19.2** *Addition:*

*Water heaters are tested with or without water, whichever is more unfavourable.*

**19.13** *Addition:*

*The temperature rises shall not exceed the values shown in Table 102.*

**Table 102 – Maximum abnormal temperature rises**

| *Part* | *Temperature rise K* |
|---|---|
| *Surfaces likely to be in contact with the skin:* | |
| *– if of metal* | *36* |
| *– if of other material* | *55* |
| *Warm air for drying parts of the human body* | *65* [a] |
| *Surfaces outside the bowl located within 250 mm of the seat* | *40* |
| *Interior of the excrement tank of **mouldering toilets*** | *100* |
| *Ducts through which excrement passes* | *100* |
| [a] *The air temperature is measured 50 mm from the air outlet.* | |

*The temperature of the water supplied by **spray seats** shall not exceed 65 °C.*

**19.101** *The appliance is supplied at **rated voltage** and operated under **normal operation**. Any fault conditions that can be expected in normal use are applied one at a time.*

NOTE Examples of fault conditions are

– failure of **thermostats**;
– failure of relays;
– open-circuiting or short-circuiting of components;
– stopping programmers in any position.

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable.

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

**21.1** *Addition:*

*Compliance is also checked by the tests of 21.101 and 21.102.*

**21.101** *The appliance is subjected to an evenly distributed force of 1 500 N applied perpendicularly to the seat, the bowl cover being open for 10 min.*

*The test is repeated with the bowl cover closed.*

*A force of 150 N is then applied for 5 s to the front edge of the bowl cover or seat in a right or left direction parallel to the hinges, whichever is more unfavourable. Then the bowl cover or seat is slowly raised and lowered. The test is carried out five times.*

*The bowl cover or seat is then raised and the force of 150 N is applied for 1 min to its front edge in a direction perpendicular to its plane. For **spray seats** and heated seats that are installed onto the toilet bowl or integrated with the toilet bowl, the force of 150 N is applied, and the bowl cover is lifted to less than an angle of 120°. If detachable parts are removed, no more force is applied.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3, 27.5 and Clause 29 is impaired.*

**21.102** *The excrement tank is completely filled with water and the appliance placed in a room having a temperature of approximately –15 °C. When the water is completely frozen, the appliance is allowed to warm up until the ice has melted. The test is carried out three times.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3 and 27.5 is impaired.*

**21.103** **Spray seats**, heated seats, enclosures and seats shall have adequate mechanical strength and be constructed to withstand repeated mechanical stresses that may be expected to occur during normal use.

*Compliance is checked by the tests of 21.103.1 and 21.103.2.*

**21.103.1** *The appliance is subjected to an evenly distributed force of 1 250 N applied perpendicularly to the seat for 4 s by a rubber disc having a thickness of 10 mm, a diameter of 300 mm and a shore A hardness of 70°, with a steel disc having a thickness of 5 mm and a diameter of 300 mm attached on its upper surface. The test is carried out 20 000 times.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3, 27.5 and Clause 29 is impaired.*

**21.103.2** *The appliance is subjected to an evenly distributed force of 890 N applied perpendicularly on each side of the seat for 1 s with a 0,5 s interval by a rubber disc having a thickness of 19 mm, a diameter of 76 mm and a shore A hardness of 70°. The test is carried out 10 000 cycles. One cycle consists of applying the force to one side and the other.*

*The appliance shall not be damaged to such an extent that compliance with 8.1, 15.1, 16.3, 27.5 and Clause 29 is impaired.*

## 22 Construction

This clause of Part 1 is applicable except as follows.

**22.2** *Modification:*

**Class I appliances** shall not incorporate an appliance inlet.

**22.24** *Replacement:*

Appliances shall not incorporate bare heating elements located in excrement tanks or as water heaters for **spray seats**.

*Compliance is checked by inspection.*

**22.33** *Modification:*

Liquids may be in direct contact with **live parts** of bare heating elements and may be heated using electrodes.

**22.48** *Addition:*

If a dynamic backflow preventer is used, the critical level shall be located not less than 25 mm above the fixture rim flood level.

**22.101** Toilets shall be **fixed appliances**.

*Compliance is checked by inspection.*

**22.102** Metal parts in contact with skin and which support the body in normal use shall be of **class II construction**.

This requirement does not apply if the metal parts in contact with skin and which support the body in normal use are earthed and permanently connected to the fixed wiring.

*Compliance is checked by inspection and, if necessary, by the relevant tests.*

**22.103** Appliances shall be constructed so that **live parts** are protected from exposure to excrement.

*Compliance is checked by inspection and, if rubber seals are used, by the following test.*

*The seal is immersed for 24 h in mineral oil having a temperature of 100 °C ± 2 °C. After the test, the volume of the seal shall not have increased by more than 50 %.*

*The oil shall have the following properties:*

– *aniline point, 93 °C ± 3 °C;*
– *viscosity, (20 ± 1) cSt at 100 °C;*
– *flash point, 245 °C ± 6 °C.*

**22.104** **Vacuum toilets** shall be constructed so that they cannot be flushed unless the bowl cover is closed.

*Compliance is checked by manual test.*

**22.105** For appliances that are controlled by **programmable electronic circuits** that limit the number of heating elements and motors from being energized 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 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:*

*For heated seats, the number of flexings is 50 000.*

**23.5** *Addition:*

Internal wiring supplying parts in the excrement tank at **safety extra-low voltage** shall not be lighter than ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53).

## 24 Components

This clause of Part 1 is applicable except as follows.

**24.101** **Thermal cut-outs** incorporated in appliances for compliance with 19.4 or 19.101 shall not be self-resetting. This requirement is not applicable to **spray seats** when a thermal link for compliance with 19.13 is connected in series with a **thermal cut-out** with an operating temperature not exceeding 65 °C, in 19.13.

*Compliance is checked by inspection.*

## 25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

**25.3** *Addition:*

Appliances incorporating water heaters having bare heating elements shall only be provided with means for connection to fixed wiring.

## 26 Terminals for external conductors

This clause of Part 1 is applicable.

## 27 Provision for earthing

This clause of Part 1 is applicable except as follows.

**27.1** *Addition:*

For **class I appliances** incorporating water heaters having bare heating elements, the water shall enter and leave through metal pipes that are permanently and reliably connected to the earthing terminal or flow over metal parts that are similarly earthed.

Parts that are liable to be in contact with excrement are considered to be accessible.

NOTE 101 Examples of such metal parts are grids or rings.

## 28 Screws and connections

This clause of Part 1 is applicable.

## 29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

**29.2** *Addition:*

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

## 30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

**30.2.2** Not applicable.

**30.2.3.1** *Modification:*

*The specified glow-wire flammability index is not applicable to water heaters having bare heating elements.*

**30.2.3.2** *Modification:*

*For water heaters having bare heating elements, the glow-wire test is carried out as specified for other connections.*

**30.101** The bowl shall not incorporate combustible material.

*Compliance is checked by subjecting non-metallic material to the needle-flame test of Annex E.*

*The test is not carried out if the material is classified as V-0 according to IEC 60695-11-10, provided that the test sample was no thicker than the relevant part.*

## 31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

*Addition:*

*Compliance is checked by the salt mist test of IEC 60068-2-52, severity 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.*

*During the test, metal parts that may be contacted by excrement shall be exposed to the salt mist.*

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

**31.101** Toilet appliances shall have adequate resistance to cleaners and urine.

*Compliance is checked by the following tests.*

*The following tests are separately applied to appliances unless electrical parts are enclosed or located so that they are unlikely to be exposed to the pollution atmosphere.*

*The appliance is kept for 96 h in a 0,055 % ± 0,005 % intensity by volume ammoniac atmosphere at room pressure.*

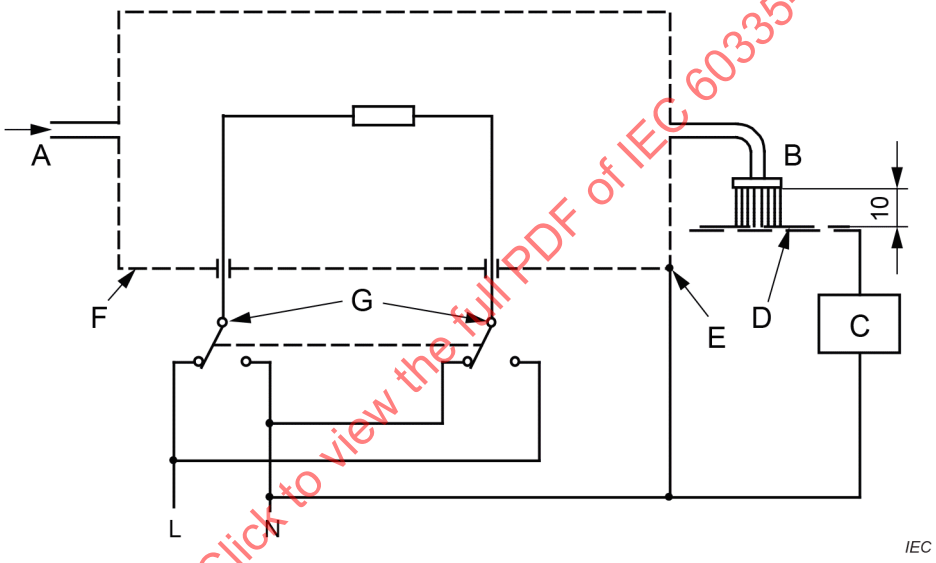
*The appliance is then kept for 96 h in a 0,000 5 % ± 0,000 2 % intensity by volume hydrochloric acid atmosphere at room pressure.*

*The appliance shall show no damage that could impair compliance with this standard.*

## 32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Dimension in millimetres




**Key**

A inlet pipe
B spray head
C circuit of Figure 4 of IEC 60990:1999
D metal sieve
E earthing terminal
F body of the water heater
G selector switch

**Figure 101 – Diagram for leakage current measurement for water heaters having bare heating elements**

## Annexes

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

## Annex R
(normative)

## Software evaluation

**R.2.2.5** *Modification:*

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

**R.2.2.9** *Modification:*

The software and safety-related hardware under its control shall be initialized and shall terminate before compliance with Clause 19 and 22.105 is impaired.

## Bibliography

The bibliography of Part 1 is applicable.

# SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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# APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

## Partie 2-84: Exigences particulières pour les appareils de toilettes

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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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9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. 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. La Norme internationale IEC 60335-2-84 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues.



Cette troisième édition annule et remplace la deuxième édition parue en 2002, l'Amendement 1:2008 et l'Amendement 2:2013. Cette édition constitue une révision technique.

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

– les définitions ont été renumérotées (Article 3);
– les exigences relatives aux instructions d'installation ont été actualisées pour prendre en compte la possibilité de 7.101 que l'étiquette soit située sur l'appareil (7.12.1);
– certaines notes ont été converties en texte normatif (7.101, 22.103, 27.1, 31);
– des exigences ont été ajoutées pour les appareils dont les circuits électroniques programmables limitent le nombre d'éléments chauffants et de moteurs alimentés en même temps (22.105, Annexe R).

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

| CDV | Rapport de vote |
|---|---|
| 61/5749/CDV | 61/5846B/RVC |

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

La présente partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements. Elle a été établie sur la base de la cinquième édition (2010) de cette norme.

NOTE 1 L'expression « 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 de sécurité pour les appareils de toilettes.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette partie 2, ce paragraphe s'applique pour autant qu'il soit raisonnable. Lorsque la présente norme spécifie « 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:

– paragraphes, tableaux et figures: ceux qui sont numérotés à partir de 101 sont complémentaires à ceux de la Partie 1;

– notes: 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 modifiés ou remplacés;

– annexes: les annexes supplémentaires sont appelées 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 mots 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 cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous « http://webstore.iec.ch » dans les données relatives à la publication recherchée. À cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

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 la présente publication soit entériné au niveau national au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

Les différences suivantes existent dans les pays indiqués ci-après.

– 3.1.9: Le fonctionnement normal est différent (USA).

– 6.2: Il est admis que les toilettes, les sièges à pulvérisation d'eau et les sièges chauffants soient IPX3 (Japon).

– 22.103: L'essai est différent (USA).

# INTRODUCTION

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

La présente norme reconnaît le niveau de protection internationalement accepté contre les dangers 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 les fonctions d'un appareil sont couvertes par différentes parties 2 de l'IEC 60335, la partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela est applicable, on tient compte de l'influence d'une fonction sur les autres fonctions.

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 normes horizontales et génériques couvrant un danger ne sont pas applicables parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335. Par exemple, dans le cas des exigences de température de surface pour de nombreux appareils, des normes génériques, comme l'ISO 13732-1 pour les surfaces chaudes, ne sont pas applicables en plus de la Partie 1 ou des parties 2.

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 norme.

# APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

## Partie 2-84: Exigences particulières pour les appareils de toilettes

## 1 Domaine d'application

L'article de la Partie 1 est remplacé par l'article ci-après.

La présente partie de l'IEC 60335 traite de la sécurité des appareils de toilettes électriques dont la tension assignée n'est pas supérieure à 250 V, dans lesquels les excréments sont stockés, séchés ou détruits ou qui lavent ou sèchent des parties du corps humain.

NOTE 101 Les dispositifs suivants sont des exemples de toilettes électriques. Ces dispositifs peuvent être utilisés pour traiter les déchets tels que le papier et les déchets alimentaires.

– **toilettes à désagrégation**;
– **toilettes à empaquetage**;
– **toilettes cryogéniques**;
– **toilettes à vide**.

La présente norme s'applique également aux équipements électriques destinés aux toilettes conventionnelles.

NOTE 102 Exemples de tels équipements électriques:

– les dispositifs pour couvrir automatiquement le siège;
– les unités pour broyer;
– les sièges chauffants;
– les unités pour pomper;
– les chauffe-eau pour les **sièges à pulvérisation d'eau**;
– les sièges à pulvérisation d'eau.

Dans la mesure du possible, la présente norme traite des dangers ordinaires présentés par les appareils et encourus par tous les individus à l'intérieur et autour de l'habitation. Cependant, elle ne tient généralement pas compte de l'utilisation de l'appareil comme jouet par des jeunes enfants.

NOTE 103 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, par les organismes nationaux responsables de l'alimentation en eau et par des organismes similaires.

NOTE 104 La présente norme ne s'applique pas

– aux appareils destinés à être utilisés dans des locaux présentant des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz);
– aux toilettes chimiques;
– aux toilettes dans lesquelles les excréments sont détruits par combustion.

## 2 Références normatives

L'article de la Partie 1 est applicable avec l'exception suivante.

*Addition:*

IEC 60068-2-52:1996[1], *Essais d'environnement – Partie 2-52: Essais – Essai Kb: Brouillard salin, essai cyclique (solution de chlorure de sodium)*

## 3 Termes et définitions

L'article de la Partie 1 est applicable avec les exceptions suivantes.

### 3.1 Définitions relatives aux caractéristiques physiques

**3.1.9** *Remplacement*:

**conditions de fonctionnement normal**
fonctionnement de l'appareil dans les conditions suivantes:

Les appareils sont mis en fonctionnement suivant des cycles, le début de chaque cycle ayant lieu toutes les 10 min, les abattants étant ouverts ou fermés, en choisissant la condition la plus défavorable. Si le cycle ne se termine pas automatiquement, l'appareil est mis en fonctionnement pendant 15 s ou pendant la période spécifiée dans les instructions, en choisissant la durée la plus longue.

Pour les **sièges à pulvérisation d'eau**, si le cycle n'est pas interrompu automatiquement, l'appareil est mis en fonctionnement pendant 30 s. Si le cycle est interrompu automatiquement, l'appareil est mis en fonctionnement pendant 30 s ou pendant la durée de fonctionnement automatique, en choisissant la durée la plus courte.

Si de l'air chaud est diffusé pour le séchage et si le cycle n'est pas interrompu automatiquement, l'appareil est mis en fonctionnement pendant 1 min. Si le cycle est interrompu automatiquement, l'appareil est mis en fonctionnement pendant 1 min ou pendant la durée d'interruption automatique, en choisissant la durée la plus courte.

Si de l'air chaud est fourni pour sécher, le cycle de séchage est initié immédiatement après la fin du cycle de douche, à moins que la séquence ne soit automatique.

Le réservoir à excréments des **toilettes à désagrégation** est vide ou rempli de tourbe, en choisissant la condition la plus défavorable.

Les **toilettes à empaquetage** sont équipées de sacs.

Pour les **toilettes cryogéniques**, une quantité d'eau de 0,3 l ayant une température de 37 °C est ajoutée à chaque cycle, les dispositifs de commande étant réglés sur la température la plus basse. Elles sont également mises en fonctionnement sans eau.

Les **sièges à pulvérisation d'eau** sont alimentés avec de l'eau à la pression la plus défavorable qui permette une aspersion effective.

### 3.5 Définitions relatives aux types d'appareils

**3.5.101**
**toilettes à désagrégation**
appareil dans lequel les excréments sont traités par séchage



[1] Cette 2ème édition a été remplacée en 2017 par une troisième édition IEC 60068-2-52:2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)* (disponible en anglais seulement) mais l'édition listée s'applique.

**3.5.102**
**toilettes à empaquetage**
appareil dans lequel les excréments sont empaquetés dans des sacs et sont entreposés dans un réservoir

**3.5.103**
**toilettes cryogéniques**
appareil dans lequel les excréments sont congelés et entreposés dans un réservoir

**3.5.104**
**toilettes à vide**
appareil dans lequel les excréments sont évacués par dépression dans un réservoir d'entreposage

**3.5.105**
**siège à pulvérisation d'eau**
appareil qui projette de l'eau pour nettoyer des parties du corps humain

Note 1 à l'article: Les **sièges à pulvérisation d'eau** peuvent intégrer des fonctions telles que le chauffage du siège, le séchage, la désodorisation ou l'ouverture/la fermeture automatique du siège et de l'abattant.

Note 2 à l'article: Les **sièges à pulvérisation d'eau** peuvent être intégrés à des toilettes.

## 4 Exigences générales

L'article de la Partie 1 est applicable.

## 5 Conditions générales d'essais

L'article de la Partie 1 est applicable avec les exceptions suivantes.

**5.2** *Addition:*

*Les essais de 31.101 ne sont pas réalisés sur un appareil distinct.*

**5.3** *Addition:*

*Les essais de 31.101 sont réalisés avant l'essai de l'Article 8.*

**5.7** Addition:

*La température de l'eau utilisée pour les essais est de 15 °C ± 5 °C.*

## 6 Classification

L'article de la Partie 1 est applicable avec les exceptions suivantes.

**6.1** *Modification:*

Les appareils comportant des chauffe-eau à éléments chauffants nus doivent être de la **classe I** ou de la **classe III**.

Les **sièges à pulvérisation d'eau** doivent être de la **classe I**, de la **classe II** ou de la **classe III**.

**6.2** *Addition:*