

INTERNATIONAL STANDARD

IEC
60335-2-84

First edition
1998-10

Safety of household and similar electrical appliances

Part 2-84: Particular requirements for toilets

Sécurité des appareils électrodomestiques et analogues

*Partie 2-84:
Règles particulières pour toilettes*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

Part 2-84: Particular requirements for toilets

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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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International Standard IEC 60335-2-84 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

It forms the first edition of IEC 60335-2-84.

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

FDIS	Report on voting
61/1481/FDIS	61/1520/RVD

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

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 third edition (1991) of that standard.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert it into the IEC standard: Safety requirements for electric toilets.

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

NOTE 1 – 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 2. When a definition of part 1 concerns an adjective, the adjective and the associated noun are also in bold.

NOTE 2 – Subclauses, figures and tables which are additional to those in part 1 are numbered starting from 101.

The following additional differences exist in some countries:

- 2.2.9: The conditions for normal operation are different (USA).
- 22.103: The test is different (USA).

The contents of the corrigendum of April 1999 have been included in this copy.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

Part 2-84: Particular requirements for toilets

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of electric toilets in which excrement is stored, dried or destructed, their **rated voltage** being not more than 250 V.

NOTE 1 – Electric toilets may be used to process garbage such as paper and food waste.

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

NOTE 2 – Examples of such electric equipment are

- pumping units,
- chopping units,
- heated seats,
- automatic seat covering devices.

So far as is practicable, this standard deals with the common hazards presented by appliances which are encountered by all persons in and around the home.

This standard does not in general take into account playing with the appliance by young children.

NOTE 3 – Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary,
- for appliances intended to be used in tropical countries, special requirements may 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 4 – 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 Definitions

This clause of part 1 is applicable except as follows.

2.2.9 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 by the instructions for use, whichever is longer.

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 set to the lowest temperature. They are also operated without water.

Shower units are supplied with water at the lowest pressure which provides an effective spray.

2.101

mouldering toilet

appliance in which the excrement is processed by drying

2.102

package toilet

appliance in which the excrement is packed in bags and stored in a tank

2.103

freezing toilet

appliance in which the excrement is frozen and stored in a tank

2.104

vacuum toilet

appliance in which the excrement is evacuated to a storage tank by negative pressure

2.105

shower unit

device incorporated in the appliance which projects water for cleaning parts of the human body

NOTE – **Shower units** may supply warm air for drying.

3 General requirement

This clause of part 1 is applicable.

4 General conditions for the tests

This clause of part 1 is applicable except as follows.

4.7 Addition:

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

5 Void

6 Classification

This clause of part 1 is applicable except as follows.

6.2 Addition:

Toilets 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 for use 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.

7.12.1 Addition:

The instructions for installation of **class I appliances** shall state that they have to be earthed.

The instructions for installation of a toilet shall state that the label concerning glowing cigarettes is to be fixed in a conspicuous place beside the toilet, if applicable.

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

NOTE 1 – The label is not required for flushing toilets if the bowl is resistant to heat and fire.

NOTE 2 – The label is to be suitable for permanent fixing.

NOTE 3 – The label may be fixed on the appliance if it is visible before using the toilet.

8 Protection against access to live parts

This clause of part 1 is applicable except as follows.

8.1.1 Addition:

The small test finger of figure 101 is also 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.

11.3 Addition:

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

11.7 Replacement:

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
<i>Surfaces likely to be in contact with the skin,</i> – if of metal – if of other material	15 25
<i>Warm air for drying parts of the human body</i>	25 ¹⁾
<i>Surfaces outside the bowl located within 25 cm of the seat</i>	30
<i>Interior of the excrement tank of mouldering toilets</i>	60
<i>Ducts through which excrement passes</i>	60
¹⁾ The air temperature is measured 5 cm from the air outlet.	

The temperature of the water supplied by **shower units** shall not exceed 40 °C.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of part 1 is applicable.

14 Void

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 subclause 14.2.4 of IEC 60529 for testing the inside of the bowl.

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:

For appliances incorporating automatic controls, compliance is also checked by the test of 19.101.

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 – if of other material	25 35
Warm air for drying parts of the human body	35 ¹⁾
Surfaces outside the bowl located within 25 cm of the seat	40
Interior of the excrement tank of mouldering toilets	100
Ducts through which excrement passes	100
¹⁾ The air temperature is measured 5 cm from the air outlet.	

*The temperature of the water supplied by **shower units** shall not exceed 50 °C.*

19.101 *The appliance is supplied at **rated voltage** and operated under **normal operation**. Any fault condition which can be expected in normal use is 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.

Addition:

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

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

The test is repeated with the bowl cover closed.

A force of 250 N is then applied to the front edge of the bowl cover or seat in a direction parallel to the hinges, the bowl cover or seat being slowly raised and lowered. The test is carried out five times.

The bowl cover or seat is then raised and the force of 250 N is applied for 1 min to its front edge in a direction perpendicular to its plane.

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

21.102 *The excrement tank is completely filled with water and the appliance is 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.

22 Construction

This clause of part 1 is applicable except as follows.

22.2 *Addition:*

Class I appliances shall not incorporate an appliance inlet.

22.24 *Replacement:*

Appliances shall not incorporate bare heating elements located in excrement tanks or liable to be in contact with water.

Compliance is checked by inspection.

22.101 Toilets shall be **fixed appliances**.

Compliance is checked by inspection.

22.102 Metal parts in contact with the skin and which support the body in normal use shall not be earthed.

*Compliance is checked by inspection and by the tests specified for **double insulation** or **reinforced insulation**.*

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 $100\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. After the test, the volume of the seal shall not have increased by more than 50 %.

NOTE – The oil has the following properties:

- aniline point $93\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
- viscosity $(20 \pm 1)\text{ cSt at } 100\text{ }^{\circ}\text{C}$
- flash point $245\text{ }^{\circ}\text{C} \pm 6\text{ }^{\circ}\text{C}$

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.

23 Internal wiring

This clause of part 1 is applicable except as follows.

23.3 Addition:

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 in order to comply with 19.4 or 19.101 shall be non-self resetting.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of part 1 is applicable.

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:

NOTE – Parts which are liable to be in contact with excrement are considered to be accessible.

28 Screws and connections

This clause of part 1 is applicable.

29 Creepage distances, clearances and distances through insulation

This clause of part 1 is applicable.

30 Resistance to heat, fire and tracking

This clause of part 1 is applicable except as follows.

30.2.2 Not applicable.

30.101 The bowl shall not incorporate combustible material.

Compliance is checked by subjecting non-metallic material to the needle-flame test of annex M.

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 is applicable.

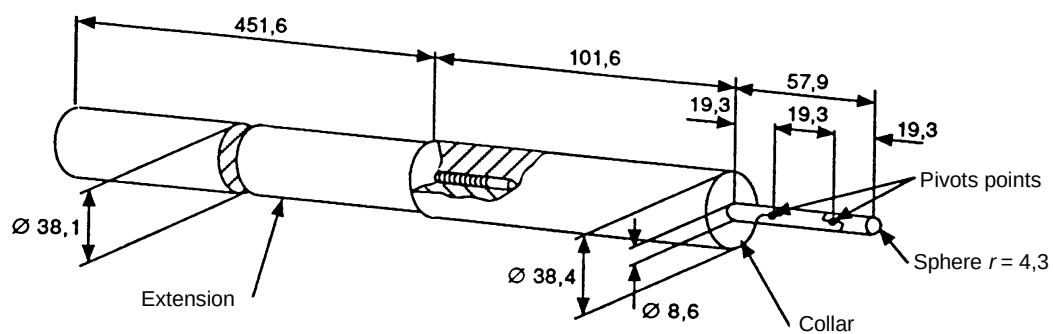
Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing 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 clauses 8 and 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.

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

32 Radiation, toxicity and similar hazards

This clause of part 1 is applicable.



IEC 440/96

Dimensions in millimetres

Material: metal

Dimensions in millimetres

Tolerances on dimensions $\pm 0,125$ mm

Both joints shall permit movement in the same plane and the same direction through an angle of 90° with a 0° to $+10^\circ$ tolerance

Figure 101 – Small test finger

Annexes

The annexes of part 1 are applicable except as follows.

Annex A (normative)

Normative references

Addition:

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

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