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 toilet~~s~~ appliances

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

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

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

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

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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 toilet~~s~~ appliances

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 91.140.70

ISBN 978-2-8322-7585-6

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

CONTENTS

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

Figure 101 – Diagram for leakage current measurement for water heaters having bare heating elements 21

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

Table 101 – Maximum normal temperature rises 13
Table 102 – Maximum abnormal temperature rises 15

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-84: Particular requirements for toilet~~s~~ 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

AVA Documents
Document Sharing Hub
Full document details: IEC 60335-2-84 2019 RLV

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**.

AVA Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub

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.

Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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.

Documents
Document Sharing Hub
Full document details: IEC 60335-2-84 2019 RLV

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.

AVA Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

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:

AVA Documents
Document Sharing Hub

Full document details: IEC 60335-2-84 2019 RLV

– *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:*

Documents
Document Sharing Hub
Full document details: IEC 60335-2-84 2019 RLV