

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-60: Particular requirements for whirlpool baths and whirlpool spas**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 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 Secretariat
3, rue de Varembe
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 It also gives information on projects, replaced and withdrawn publications.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.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IECNORM.COM : Click to view the full PDF of IEC 60352-60:2023 CMV



IEC 60335-2-60

Edition 5.0 2023-12
COMMENTED VERSION

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-60: Particular requirements for whirlpool baths and whirlpool spas**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 13.120, 97.030

ISBN 978-2-8322-8049-2

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

CONTENTS

FOREWORD	4
INTRODUCTION	7
1 Scope	8
2 Normative references	9
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~~ Charging of metal-ion batteries	14
13 Leakage current and electric strength at operating temperature	14
14 Transient overvoltages	14
15 Moisture resistance	14
16 Leakage current and electric strength	15
17 Overload protection of transformers and associated circuits	15
18 Endurance	15
19 Abnormal operation	15
20 Stability and mechanical hazards	16
21 Mechanical strength	16
22 Construction	16
23 Internal wiring	18
24 Components	18
25 Supply connection and external flexible cords	19
26 Terminals for external conductors	19
27 Provision for earthing	19
28 Screws and connections	19
29 Clearances, creepage distances and solid insulation	19
30 Resistance to heat and fire	20
31 Resistance to rusting	20
32 Radiation, toxicity and similar hazards	20
Annexes	22
Bibliography	23
List of comments	24
Figure 101 – Installation zone dimensions for transportable whirlpool spas	20
Figure 102 – Probe for measuring surface temperatures	21

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions	13
---	----

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-60: Particular requirements for whirlpool baths and whirlpool spas

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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This commented version (CMV) of the official standard IEC 60335-2-60:2023 edition 5.0 allows the user to identify the changes made to the previous IEC 60335-2-60:2017 edition 4.0. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

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

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

IEC 60335-2-60 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2017. This edition constitutes a technical revision.

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

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, 7.12.1);
- c) addition of hyperthermia instructions and installation instructions related to the wiring rules (7.12, 7.12.1);
- d) modifications related to IEC 60364-7-702 and transportable whirlpool spas (Clause 1, 5.101, 6.1, 6.2, 7.12.1, 7.15, 13.1, 13.2, 16.1, 16.2, 22.33, 22.107, 25.1);
- e) introduction of surface temperature limits (Clause 11);
- f) addition of water temperature limit at the suction/return openings (11.8, 11.101);
- g) modification to the tests of 19.2 and 19.3 specifying the types of devices that are rendered inoperative.
- h) addition of requirement for thermal cut-outs to be trip free (24.101).

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

Draft	Report on voting
61/7009/FDIS	61/7085/RVD

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

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

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

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

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

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

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

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

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

NOTE 3 The following print types are used:

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

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

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

- reconfirmed,
- withdrawn, or
- revised.

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

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

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

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

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

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

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

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

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

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

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

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

NOTE 2 ~~Horizontal and generic standards~~ Horizontal publications, basic safety standards and group safety 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.~~ 1

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

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

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

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

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-60: Particular requirements for whirlpool baths and whirlpool spas

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **whirlpool baths** for indoor use and **whirlpool spas**, for household and similar ~~purposes~~ use, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances, ~~including direct current (DC) supplied appliances and battery-operated appliances.~~ **3**

This standard also applies to appliances for circulating air or water in conventional baths.

This standard applies to factory-built self-contained **whirlpool baths** or **whirlpool spas** in which all controls and components are integral parts of the appliance and are located within or affixed to the **whirlpool bath** or **whirlpool spa** structure. **4**

Appliances not intended for normal household use but that nevertheless ~~may~~ can be a source of danger to the public, such as appliances intended to be used by laymen in hotels, fitness centres and similar places, are within the scope of this standard.

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:

- persons (including children) whose
 - physical, sensory or mental capabilities; or
 - lack of experience and knowledgeprevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

~~NOTE 101~~ 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 water supply authorities, the national authorities responsible for the protection of labour and similar authorities.

~~NOTE 102~~ This standard does not apply to

- equipment for water circulation in swimming and motion exercise pools;
- cleaning appliances for swimming pools;
- appliances intended for medical purposes (IEC 60601 series);
- field-engineered, non-self-contained permanently installed **whirlpool baths** or **whirlpool spas** custom designed to fit a specific location, being assembled or constructed at the final installation location; **5**

- 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).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60364-7-701, *Low-voltage electrical installations – Requirements for special installations or locations – Locations containing a bath or shower*

IEC 60364-7-702, *Low voltage electrical installations – Part 7-702: Requirements for special installations or locations – Swimming pools and fountains*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 ~~Replacement~~ Modification:

Replace the first paragraph with the following: **6**

~~normal operation~~

operation of the appliance under the following conditions:

Whirlpool baths for indoor use and **whirlpool spas** are filled with water to the maximum level allowed by the construction.

For separate appliances intended to be used with a conventional bath, the bath is filled with water to a depth of approximately 200 mm or to the maximum level specified in the instructions, whichever is more unfavourable.

3.5 Definitions relating to types of appliances

3.5.1

~~portable appliance~~

Addition:

Note 101 to entry: **Transportable whirlpool spas** are not considered ~~to be~~ **portable appliances**.

3.5.101

transportable whirlpool spa

whirlpool spa that is intended to be set up and ~~disassembled~~ **relocated** **7** from time to time for the purpose of moving it to different areas for use

3.5.102

whirlpool bath

appliance used by persons to immerse themselves in water that incorporates provisions for blowing air or water circulation and ~~may~~ **can** have provisions for water heating, the appliance intended to be drained after use

3.5.103

whirlpool spa

appliance used by one or more persons at the same time to immerse themselves in water that incorporates provisions for blowing air or water circulation and provisions for water heating, the appliance not intended to be drained after use

3.6 Definitions relating to parts of an appliance

3.6.4

live part

Modification:

Replace Note 1 to entry with the following:

Note 1 to entry: Parts are considered to be **live parts** even if they comply with 8.1.4.

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.

5.7 Addition:

If the tests are influenced by the temperature of the water, it is maintained at 40 °C or at the maximum value allowed by the control, whichever is greater.

~~5.101 Transportable whirlpool spas are tested as portable appliances.~~ **8**

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Modification:

Replace the first paragraph with the following:

Portable appliances shall be **class II** or **class III**.

Whirlpool spas shall be **class I** or **class III**.

Whirlpool baths and other **stationary appliances** shall be **class I**, **class II** or **class III**. **9**

~~Transportable whirlpool spas having metal parts in contact with water shall be class I or class III.~~

6.2 Addition:

Whirlpool baths and **whirlpool spas** shall be at least IPX5. Other appliances shall be at least IPX4. This does not apply to parts of appliances, other than **transportable whirlpool spas**, intended for mounting within the dwelling but outside the zones 0, 1 and 2 as specified in IEC 60364-7-701 ~~shall be at least IPX0~~ and IEC 60364-7-702. **10**

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.12 Addition:

The instructions shall provide details concerning cleaning and other maintenance.

The instructions for **portable appliances** shall state that no part of the appliance is to be located above the bath during use.

The instructions for **whirlpool spas** shall provide information concerning:

- maintenance of water purity, especially pH values and chlorine or other recommended sanitizer concentrations;
- cleaning and disinfection;
- use and installation of a cover;
- disposal of water;
- precautions to avoid damage due to water freezing;
- precautions to avoid damage when the appliance is left empty for an extended period.

For **whirlpool baths** with provision for water heating and **whirlpool spas**, other than those provided with a temperature control limiting the average temperature of the water to a value not exceeding 40 °C when measured in accordance with 11.101, the instructions shall contain the substance of the following:

In order to avoid the possibility of hyperthermia (heat stress) occurring it is recommended that the average water temperature should not exceed 40 °C. **11**

7.12.1 Addition:

The installation instructions shall state the substance of the following:

- parts containing live parts, except parts supplied with safety extra-low voltage not exceeding 12 V, must be inaccessible to a person in the bath or spa; **12**
- earthed appliances must be permanently connected to fixed wiring except for transportable whirlpool spas with earthing, which must only be plugged directly into an earthed socket-outlet of the fixed wiring;
- parts incorporating electrical components, except remote control devices, must be located or fixed so that they cannot fall into the bath or spa; **13**
- the appliance must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

~~The installation instructions shall give details on how to follow the wiring rules, for example specifying that parts are installed in the correct zone and that equipotential bonding is carried out.~~

For appliances other than **transportable whirlpool spas**, the installation instructions shall provide details for the application of the wiring rules. This includes:

- for **whirlpool baths**, the applicability of IEC 60364-7-701;
- for **whirlpool spas**, the applicability of IEC 60364-7-702;
- specifying that parts must be installed in the correct zone; and
- installation details for protective equipotential bonding. **14**

When placing a **transportable whirlpool spa**, ensure that all socket-outlets or other electrical equipment are at least 1,25 m from the internal rim of the water container as shown in Figure 101. **15**

If the appliance is intended to be fixed by screws or other permanent fixing devices, the installation instructions shall give details on how to fix the appliance unless the method of fixing is obvious.

~~NOTE 101 This instruction is not necessary if the method of fixing is obvious.~~

The installation instructions for **whirlpool spas** shall state that:

- the floor has to be capable of supporting the expected load;
- an adequate drainage system has to be provided to deal with overflow water.

7.15 Modification:

Replace the second sentence of the second paragraph with the following:

For **portable appliances** and **transportable whirlpool spas**, it shall be possible to remove or open this cover without the aid of a tool. **16**

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 Addition:

*In addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. **17***

8.1.4 Modification:

Replace the first paragraph with the following:

Any energized part is considered to be a **live part**.

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:

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 102 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of $4\text{ N} \pm 1\text{ N}$ to the surface in such a*

way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used. **18**

11.7 Modification:

Replace the first paragraph with the following:

Appliances are operated until steady conditions are established. **19**

11.8 Modification:

Replace the first paragraph with the following:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101. **20**

Addition:

*If the appliance incorporates a heating element, the water temperature at the inlet of the **whirlpool bath** or **whirlpool spa** shall not exceed 50 °C and the water temperature at the suction opening/return point shall not exceed 43 °C.* **21**

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

Surface ^a	Temperature rise of accessible external surfaces K
Bare metal	38
Coated metal ^b	42
Glass and ceramic	51
Plastic and plastic coating > 0,4 mm ^{c, d}	58
NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
^a Temperature rises are not measured on: – surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end; – the hot water supply fittings and hoses; – plumbing fittings, pressure relief valves and sight gauges; – surfaces that are submersed during normal operation.	
^b Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.	
^c The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.	
^d When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.	

11.101 For **whirlpool baths** with a water heating function and **whirlpool spas** having a control that limits the average temperature of the water to max 40 °C, the control shall be set to its maximum temperature. The water temperature shall be measured at each water inlet and at each suction opening in the basin.

The average of the maximum water temperatures at any inlet and the maximum water temperatures at any suction opening shall not be greater than 40 °C, unless the instructions in 7.12 regarding hyperthermia are provided. 22

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

This clause of Part 1 is applicable. 23

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows:

13.1 Modification:

Replace the last paragraph with the following:

***Protective impedance** and radio interference filters are disconnected only before carrying out the tests of 13.3.* 24

13.2 Modification:

Delete the third paragraph and replace the second paragraph by the following:

The leakage current is measured between any pole of the supply and:

- ***accessible metal parts** intended to be connected to protective earth, for **class I appliances**;*
- *metal foil having an area not exceeding 20 cm × 10 cm which is in contact with **accessible surfaces** of insulating materials and metal parts not intended to be connected to protective earth, for **class II appliances**, **class II constructions** and **class III appliances**. The metal foil has the largest area possible on the surface under test without exceeding the dimensions specified. If its area is smaller than the surface under test, it is moved to test all parts of the surface. The heat dissipation of the appliance shall not be affected by the metal foil;*
- *for **class II appliances**, **class II constructions** and **class III appliances**, a metal electrode immersed in the water of the **whirlpool bath** or **whirlpool spa**. The metal electrode shall have dimensions of approximately 40 cm × 40 cm. The water used for this test shall be the saline solution used in 15.2, but without rinsing agent.* 25

Addition:

*For **class I transportable whirlpool spas**, the leakage current shall not exceed 0,75 mA.* 26

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 Addition:

*Traces of water on the insulation of parts supplied at **safety extra-low voltage** not exceeding 12 V are ignored.*

15.1.2 Addition:

Whirlpool baths and **whirlpool spas** are tested without side panels fitted unless they are an integral part of the appliance.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows:

16.1 Modification:

Replace the penultimate paragraph with the following:

Protective impedance is disconnected from **live parts** only before carrying out the tests of 16.3. **27**

16.2 Modification:

Add the following as a third dashed item in the first paragraph:

- for **class II appliances**, **class II constructions** and **class III appliances**, a metal electrode immersed in the water of the **whirlpool bath** or **whirlpool spa**. The metal electrode shall have dimensions of approximately 40 cm × 40 cm. The water used for this test shall be the saline solution used in 15.2, but without rinsing agent. **28**

Delete the fifth paragraph starting with "The values specified above are doubled". **29**

Addition:

For **class I transportable whirlpool spas**, the leakage current shall not exceed 0,75 mA. **30**

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable except as follows.

Addition:

The test is repeated with chlorinator cells loaded so that the current is 95 % of the lowest current that causes a **protective device** to operate. The test is continued until steady conditions are established.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.2 Addition:

For appliances in which water is circulated, the **whirlpool bath** or **whirlpool spa** is filled and the appliance operated, after which it is switched off and the **whirlpool bath** or **whirlpool spa**

emptied. Heating elements are then switched on, if possible, the pump being operated or at rest, whichever is more unfavourable.

For appliances in which air is circulated, air inlets and outlets are blocked. Heating elements are then switched on, if possible, the blower being in operation.

19.7 Addition:

*The test is carried out with the **whirlpool bath** or **whirlpool spa** filled as specified for **normal operation**.*

19.13 Addition:

*The temperature at the inlet of **whirlpool baths** that have provisions for water heating and **whirlpool spas** shall not exceed 55 °C when measured in accordance with Clause 11.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable, except as follows.

20.2 Addition:

In addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18. 31

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Addition:

***Whirlpool spas** are also subjected to the impact test after the appliance has been maintained at a temperature of –10 °C for 24 h, unless they are intended for indoor use only.*

If the appliance is too large for the conditioning room, parts of the appliance may be tested separately. In this case, the impact test is carried out immediately after the conditioning without reassembly.

*For water containers that provide protection against access to **live parts**, the value of the impact energy is 1 J.*

22 Construction

This clause of Part 1 is applicable except as follows.

22.33 Addition:

Conductive liquids may be in direct contact with **live parts** supplied at **safety extra-low voltage** not exceeding 12 V.

NOTE 101 This does not allow direct access to **live parts**, which is prohibited by application of Clause 8.

Parts mounted in the basin or in walls of the basin, such as ~~switches~~ lamps or luminaires, and ~~controls~~ parts accessible to the user in the **whirlpool bath** or **whirlpool spa**, such as switches and controls, shall only be supplied at **safety extra-low voltage** not exceeding 12 V. **32**

Class III portable appliances and **class III whirlpool spas** shall have a **rated voltage** not exceeding 12 V. **33**

22.101 Appliances in which air is circulated shall be constructed so that water cannot penetrate into the motor and come into contact with **live parts** or **basic insulation**.

Compliance is checked by the following test.

*The overflow outlet of **whirlpool baths** and **whirlpool spas** is blocked and the bath or spa is filled until water overflows. Non-return valves are rendered inoperative one at a time.*

*Separate appliances intended to be used with a conventional bath are placed on the floor, except that **portable mats** are placed in a bath filled with water. The mat is then raised to the most unfavourable position allowed by the construction of the appliance but to a height not exceeding 2 m. Non-return valves are rendered inoperative one at a time.*

The test is carried out with all possible methods of connecting the hose.

*After the test, there shall be no trace of water on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

22.102 Whirlpool baths shall be constructed so that the quantity of water that remains in the appliance after emptying the bath and is recirculated the next time the bath is used shall not exceed 0,5 l or 0,2 % of the capacity of the bath, whichever is less.

The capacity of the **whirlpool bath** is considered to be the volume of water required to fill the bath until water starts to flow through the overflow outlet.

Compliance is checked by any suitable method, such as measurements using chemical dilution, weighing or determination of volume.

22.103 Whirlpool baths and **whirlpool spas** shall be constructed so that hair cannot be drawn into apertures due to water suction if this could result in a hazard.

Compliance is checked by the following test.

*The appliance is filled as specified for **normal operation**.*

A mass of 50 g of medium or fine natural human hair is attached to a wooden rod having a diameter of 25 mm, the free length of hair being 400 mm. The rod ~~is to~~ shall have sufficient length for the hair to reach the suction opening. The hair is saturated for at least 2 min in the water.

*The free end of the hair is placed over the suction opening and the appliance operated while supplied at **rated voltage**. The hair is moved from side to side for up to 2,5 min in an attempt to get it sucked completely into the opening.*

The rod is pulled in order to withdraw the hair from the water and the pull force is measured with

- the rod pulled vertically;
- the rod pulled at an angle of approximately 40° to the vertical.

The force shall not exceed 20 N.

*If the **whirlpool bath** or **whirlpool spa** is provided with a **detachable cover** for the suction opening, the test is also carried out with the cover in place. During the test, the hair is used to sweep the cover in an attempt to displace it.*

The test is carried out five times.

*If the **whirlpool bath** or **whirlpool spa** has more than one suction opening, they are tested in turn. The hair is brushed periodically to keep it tangle free.*

22.104 Portable appliances and transportable whirlpool spas **34** shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 20 mm.*

22.105 Whirlpool spas shall incorporate a water filtration system in order that the required level of water purity can be achieved. The filtration system does not have to automatically control the pH value of the water.

Compliance is checked by inspection.

22.106 For **class I transportable whirlpool spas**, except parts of **class III construction** with a **working voltage** not exceeding 12 V, all metal parts that are in contact with water shall be connected to protective earth. The metal parts in contact with the water shall be resistant to corrosion. **35**

For **class I transportable whirlpool spas** metal parts of heating elements that are in contact with water shall be separated from **live parts** by **double insulation** or **reinforced insulation** consisting of at least 3 layers. Other metal parts, except parts of **class III construction** with a **working voltage** not exceeding 12 V, that are in contact with the water shall be separated from **live parts** by **double insulation** or **reinforced insulation**.

Compliance is checked by inspection and the relevant tests.

22.107 Parts of **portable appliances** intended to be immersed in water shall be **class III construction** with a **working voltage** not exceeding 12 V.

*Compliance is checked by inspection and the relevant tests. **36***

23 Internal wiring

This clause of Part 1 is applicable.

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 shall not be **self-resetting thermal cut-outs** and shall have at least a type 1.E trip-free mechanism according to IEC 60730-1. **37**

Compliance is checked by inspection.

24.102 Class III appliances shall be provided with a **safety isolating transformer** classified at least IPX4.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 ~~Modification~~ Addition:

Class I appliances, other than **transportable whirlpool spas**, shall only be provided with means for permanent connection to fixed wiring.

Transportable whirlpool spas and **portable appliances** **38** shall only be provided with a **supply cord** fitted with a plug. The **supply cord** shall have a length of at least 5 m and a maximum length of 8 m. **39**

Portable appliances where the functional part is of **class III construction** supplied from a **detachable power supply part** shall have an **interconnection cord** having a length of at least 5 m. There is no limit on the length of the **supply cord** for the **detachable power supply part**. **40**

25.5 Addition:

Type X attachments are not allowed for **transportable whirlpool spas**.

25.7 Addition:

Supply cords for **transportable whirlpool spas** shall not be lighter than rubber sheathed cords. Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57).

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.

27.2 Addition:

Class I appliances shall be provided with a terminal for the connection of external equipotential bonding conductors.

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.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

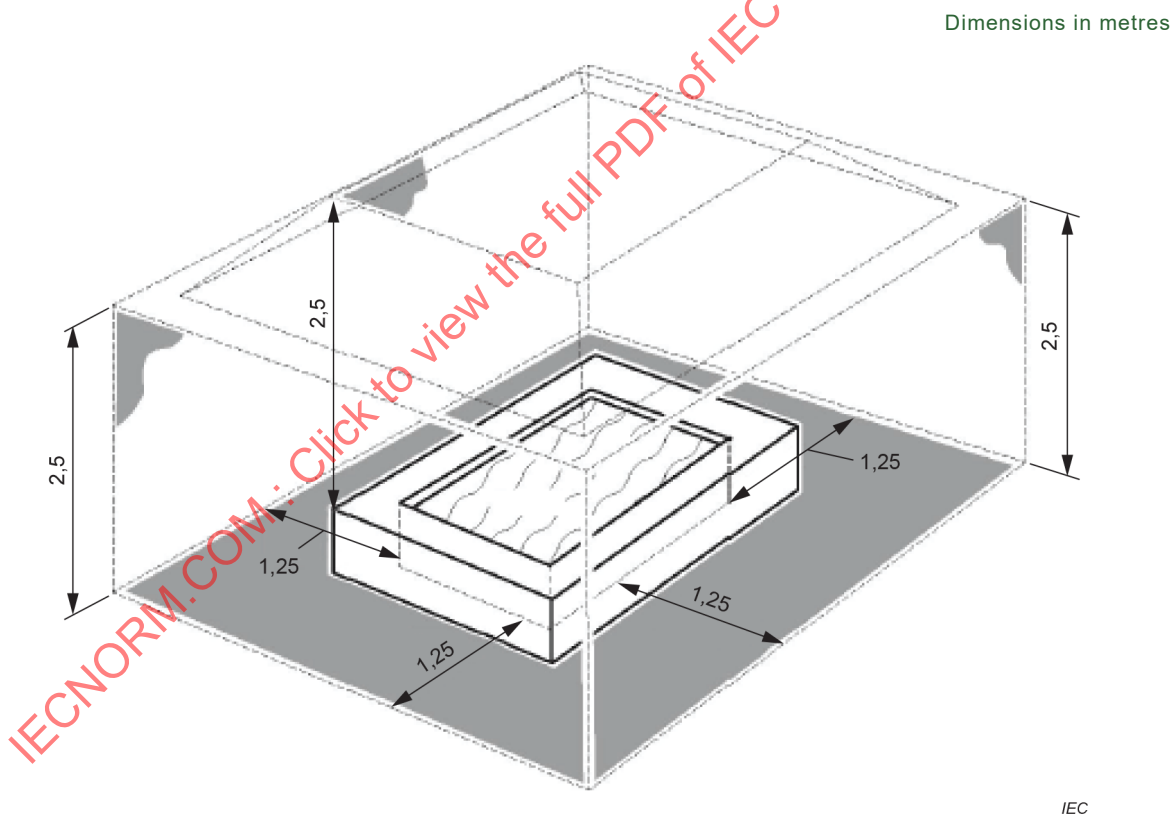
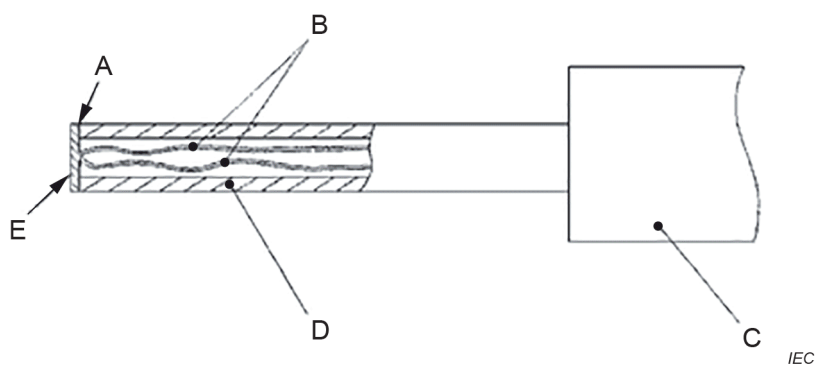


Figure 101 – Installation zone dimensions for transportable whirlpool spas 41



Key

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

Figure 102 – Probe for measuring surface temperatures

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

Annexes

The annexes of Part 1 are applicable.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

Bibliography

The bibliography of Part 1 is applicable.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

List of comments

- 1 This revision is for alignment with IEC 60335-1:2020.
- 2 This revision is for alignment with IEC 60335-1:2020.
- 3 This revision is for alignment with IEC 60335-1:2020.
- 4 The Scope is clarified to cover only self-contained appliances and exclude appliances that are built in the field.
- 5 The Scope is clarified to cover only self-contained appliances and exclude appliances that are built in the field.
- 6 This revision maintains the normal operation while charging as specified in IEC 60335-1:2020.
- 7 Some transportable whirlpool spas do not need to be disassembled to be moved to a different area of use.
- 8 Transportable whirlpool spas are not portable appliances. To avoid any confusion, Subclause 5.101 is deleted and the requirements for portable appliances are reviewed and transportable whirlpool spas are added to those portable appliance requirements that are applicable for transportable whirlpool spas.
- 9 The classifications are updated to align with the installation requirements in IEC 60364-7-701 and IEC 60364-7-702.
- 10 A reference is added to IEC 60364-7-702 because this standard is applicable for the installation of whirlpool spas. In addition, transportable whirlpool spas are excluded from the second sentence because they are installed and can be relocated by the user.
- 11 Instructions are added to inform the user of the risk of hyperthermia and recommend the maximum average water temperature to avoid it.
- 12 The term “spa” is added as the required warning is not only applicable to baths.
- 13 The term “spa” is added as the required warning is not only applicable to baths.
- 14 The relevant installation standard shall be specifically referenced in the installation instructions for the appliance.
- 15 Transportable whirlpool spas are installed and can be relocated by the user. The user may not be familiar with the recommended zone dimensions or have access to the installation standard. In addition, the installation standard is not applicable for transportable whirlpool spas because they are not fixed installations. Therefore, additional installation instructions are needed with respect to properly locating the appliance away from other electrical sources or equipment.
- 16 Transportable whirlpool spas are not portable appliances. To avoid any confusion, Subclause 5.101 is deleted and the requirements for portable appliances are reviewed and transportable whirlpool spas are added to those portable appliance requirements that are applicable for transportable whirlpool spas.
- 17 These appliance are located on the floor where they are accessible to children up to 3 years in age.
- 18 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces based on IEC Guide 117 for Temperatures of touchable hot surfaces.
- 19 The duration of operation for the heating test is added similar to other Part 2 standards.

- 20 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces based on IEC Guide 117 for Temperatures of touchable hot surfaces.
- 21 In order to reduce the likelihood of hyperthermia, a maximum water temperature is added for the water at the suction opening/return point.
- 22 If the average temperature of the water in the appliance is less than 40 °C, the instructions warning against hyperthermia are not necessary. The test method for determining the maximum average temperature is added to Subclause 11.101.
- 23 This revision is for alignment with IEC 60335-1:2020.
- 24 In normal use, the effect of an electric shock is increased by a reduction in body resistance and contact of the body with earth potential because the user is submersed in water within the appliance. Therefore, protective impedance and radio interference filters shall not be disconnected for the tests of Subclause 13.2. The leakage current shall be limited to safe values no matter if the leakage current is due to protective impedances, filter capacitors or leakage through solid insulation. Therefore the total leakage current shall be measured and be below the limits given in Subclause 13.2.
- 25 Because the user is submersed in the water within the appliance, leakage current is also measured to an electrode immersed in the water within the bath or spa.
- 26 Transportable whirlpool spas are not portable appliances. To avoid any confusion, Subclause 5.101 is deleted and the requirements for portable appliances are reviewed and transportable whirlpool spas are added to those portable appliance requirements that are applicable for transportable whirlpool spas.
- 27 In normal use, the effect of an electric shock is increased by a reduction in body resistance and contact of the body with earth potential because the user is submersed in water within the appliance. Therefore, protective impedance and radio interference filters shall not be disconnected for the tests of Subclause 16.2. The leakage current shall be limited to safe values no matter if the leakage current is due to protective impedances, filter capacitors or leakage through solid insulation. Therefore the total leakage current shall be measured and be below the limits given in Subclause 16.2.
- 28 Because the user is submersed in the water within the appliance, leakage current is also measured to an electrode immersed in the water within the bath or spa.
- 29 In normal use, the effect of an electric shock is increased by a reduction in body resistance and contact of the body with earth potential because the user is submersed in water within the appliance. Therefore, doubling of the limits is not allowed.
- 30 Transportable whirlpool spas are not portable appliances. To avoid any confusion, Subclause 5.101 is deleted and the requirements for portable appliances are reviewed and transportable whirlpool spas are added to those portable appliance requirements that are applicable for transportable whirlpool spas.
- 31 These appliance are located on the floor where they are accessible to children up to 3 years in age.
- 32 The existing requirement for switches and controls is also applicable for electrical parts mounted in the basin of the bath or spa and for parts accessible to the user from within the bath or spa because this is zone 0 according to the installation standards IEC 60364-7-701 and 60364-7-702.
- 33 The rated voltage of these class III appliances shall not exceed 12 V according to the installation standards IEC 60364-7-701 and IEC 60364-7-702, because the appliance is in zone 0.

- 34 Transportable whirlpool spas are not portable appliances. To avoid any confusion, Subclause 5.101 is deleted and the requirements for portable appliances are reviewed and transportable whirlpool spas are added to those portable appliance requirements that are applicable for transportable whirlpool spas.
- 35 This requirement is applicable for all whirlpool spas, including transportable whirlpool spas. However, it is not applicable for parts of class III construction if the working voltage does not exceed 12 V.
- 36 This aligns the voltage limitation of parts of these portable appliances intended to be immersed in water with the voltage limits specified in Subclause 22.106 for stationary baths and spas.
- 37 The use of a type 1.E trip-free mechanism prevents excessive water temperatures that can result in hyperthermia due to continued use of the appliance when it is operating in a fault condition.
- 38 Transportable whirlpool spas are not portable appliances. To avoid any confusion, Subclause 5.101 is deleted and the requirements for portable appliances are reviewed and transportable whirlpool spas are added to those portable appliance requirements that are applicable for transportable whirlpool spas.
- 39 A maximum cord length is added because longer cords result in additional resistance in the earthing conductor.
- 40 In order to allow the detachable power supply part to be located outside of zones 0 and 1 according to IEC 60364-7-701, the minimum length for the interconnecting cord must be specified.
- 41 Transportable whirlpool spas are installed and can be relocated by the user. Therefore, Figure 101 is provided in the installation instructions for properly locating the appliance away from other electrical sources.
-

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –
Part 2-60: Particular requirements for whirlpool baths and whirlpool spas**

**Appareils électrodomestiques et analogues – Sécurité –
Partie 2-60: Exigences particulières pour les baignoires et les spas à système
de brassage d'eau**

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	8
3 Terms and definitions	8
4 General requirement.....	9
5 General conditions for the tests	9
6 Classification.....	9
7 Marking and instructions.....	9
8 Protection against access to live parts.....	11
9 Starting of motor-operated appliances	11
10 Power input and current.....	11
11 Heating.....	11
12 Charging of metal-ion batteries	12
13 Leakage current and electric strength at operating temperature.....	12
14 Transient overvoltages	13
15 Moisture resistance	13
16 Leakage current and electric strength.....	13
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	15
23 Internal wiring.....	17
24 Components	17
25 Supply connection and external flexible cords	17
26 Terminals for external conductors.....	18
27 Provision for earthing	18
28 Screws and connections	18
29 Clearances, creepage distances and solid insulation	18
30 Resistance to heat and fire	18
31 Resistance to rusting	18
32 Radiation, toxicity and similar hazards.....	18
Annexes	20
Bibliography.....	21
Figure 101 – Installation zone dimensions for transportable whirlpool spas.....	19
Figure 102 – Probe for measuring surface temperatures	19
Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-60: Particular requirements for whirlpool baths
and whirlpool spas****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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60335-2-60 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2017. This edition constitutes a technical revision.

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

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, 7.12.1);
- c) addition of hyperthermia instructions and installation instructions related to the wiring rules (7.12, 7.12.1);

- d) modifications related to IEC 60364-7-702 and transportable whirlpool spas (Clause 1, 5.101, 6.1, 6.2, 7.12.1, 7.15, 13.1, 13.2, 16.1, 16.2, 22.33, 22.107, 25.1);
- e) introduction of surface temperature limits (Clause 11);
- f) addition of water temperature limit at the suction/return openings (11.8, 11.101);
- g) modification to the tests of 19.2 and 19.3 specifying the types of devices that are rendered inoperative.
- h) addition of requirement for thermal cut-outs to be trip free (24.101).

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

Draft	Report on voting
61/7009/FDIS	61/7085/RVD

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

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

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

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

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

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

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

NOTE 2 The following numbering system is used:

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

NOTE 3 The following print types are used:

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

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

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

- reconfirmed,
- withdrawn, or
- revised.

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

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

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

NOTE 2 Horizontal publications, basic safety standards and group safety 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.

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

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

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

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

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-60: Particular requirements for whirlpool baths and whirlpool spas

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **whirlpool baths** for indoor use and **whirlpool spas**, for household and similar use, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances, including direct current (DC) supplied appliances and **battery-operated appliances**.

This standard also applies to appliances for circulating air or water in conventional baths.

This standard applies to factory-built self-contained **whirlpool baths** or **whirlpool spas** in which all controls and components are integral parts of the appliance and are located within or affixed to the **whirlpool bath** or **whirlpool spa** structure.

Appliances not intended for normal household use but that nevertheless can be a source of danger to the public, such as appliances intended to be used by laymen in hotels, fitness centres and similar places, are within the scope of this standard.

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:

- persons (including children) whose
 - physical, sensory or mental capabilities; or
 - lack of experience and knowledgeprevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

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

This standard does not apply to

- equipment for water circulation in swimming and motion exercise pools;
- cleaning appliances for swimming pools;
- appliances intended for medical purposes (IEC 60601 series);
- field-engineered, non-self-contained permanently installed **whirlpool baths** or **whirlpool spas** custom designed to fit a specific location, being assembled or constructed at the final installation location;

- 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).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60364-7-701, *Low-voltage electrical installations – Requirements for special installations or locations – Locations containing a bath or shower*

IEC 60364-7-702, *Low voltage electrical installations – Part 7-702: Requirements for special installations or locations – Swimming pools and fountains*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 Modification:

Replace the first paragraph with the following:

operation of the appliance under the following conditions:

Whirlpool baths for indoor use and **whirlpool spas** are filled with water to the maximum level allowed by the construction.

For separate appliances intended to be used with a conventional bath, the bath is filled with water to a depth of approximately 200 mm or to the maximum level specified in the instructions, whichever is more unfavourable.

3.5 Definitions relating to types of appliances

3.5.1 Addition:

Note 101 to entry: **Transportable whirlpool spas** are not considered **portable appliances**.

3.5.101

transportable whirlpool spa

whirlpool spa that is intended to be set up and relocated from time to time for the purpose of moving it to different areas for use

3.5.102

whirlpool bath

appliance used by persons to immerse themselves in water that incorporates provisions for blowing air or water circulation and can have provisions for water heating, the appliance intended to be drained after use

3.5.103

whirlpool spa

appliance used by one or more persons at the same time to immerse themselves in water that incorporates provisions for blowing air or water circulation and provisions for water heating, the appliance not intended to be drained after use

3.6 Definitions relating to parts of an appliance

3.6.4 Modification:

Replace Note 1 to entry with the following:

Note 1 to entry: Parts are considered to be **live parts** even if they comply with 8.1.4.

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.

5.7 Addition:

If the tests are influenced by the temperature of the water, it is maintained at 40 °C or at the maximum value allowed by the control, whichever is greater.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Modification:

Replace the first paragraph with the following:

Portable appliances shall be **class II** or **class III**.

Whirlpool spas shall be **class I** or **class III**.

Whirlpool baths and other **stationary appliances** shall be **class I**, **class II** or **class III**.

6.2 Addition:

Whirlpool baths and **whirlpool spas** shall be at least IPX5. Other appliances shall be at least IPX4. This does not apply to parts of appliances, other than **transportable whirlpool spas**, intended for mounting within the dwelling but outside the zones 0, 1 and 2 as specified in IEC 60364-7-701 and IEC 60364-7-702.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.12 Addition:

The instructions shall provide details concerning cleaning and other maintenance.

The instructions for **portable appliances** shall state that no part of the appliance is to be located above the bath during use.

The instructions for **whirlpool spas** shall provide information concerning:

- maintenance of water purity, especially pH values and chlorine or other recommended sanitizer concentrations;
- cleaning and disinfection;
- use and installation of a cover;
- disposal of water;
- precautions to avoid damage due to water freezing;
- precautions to avoid damage when the appliance is left empty for an extended period.

For **whirlpool baths** with provision for water heating and **whirlpool spas**, other than those provided with a temperature control limiting the average temperature of the water to a value not exceeding 40 °C when measured in accordance with 11.101, the instructions shall contain the substance of the following:

In order to avoid the possibility of hyperthermia (heat stress) occurring it is recommended that the average water temperature should not exceed 40 °C.

7.12.1 Addition:

The installation instructions shall state the substance of the following:

- parts containing live parts, except parts supplied with safety extra-low voltage not exceeding 12 V, must be inaccessible to a person in the bath or spa;
- earthed appliances must be permanently connected to fixed wiring except for transportable whirlpool spas with earthing, which must only be plugged directly into an earthed socket-outlet of the fixed wiring;
- parts incorporating electrical components, except remote control devices, must be located or fixed so that they cannot fall into the bath or spa;
- the appliance must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

For appliances other than **transportable whirlpool spas**, the installation instructions shall provide details for the application of the wiring rules. This includes:

- for **whirlpool baths**, the applicability of IEC 60364-7-701;
- for **whirlpool spas**, the applicability of IEC 60364-7-702;
- specifying that parts must be installed in the correct zone; and
- installation details for protective equipotential bonding.

When placing a **transportable whirlpool spa**, ensure that all socket-outlets or other electrical equipment are at least 1,25 m from the internal rim of the water container as shown in Figure 101.

If the appliance is intended to be fixed by screws or other permanent fixing devices, the installation instructions shall give details on how to fix the appliance unless the method of fixing is obvious.

The installation instructions for **whirlpool spas** shall state that:

- the floor has to be capable of supporting the expected load;
- an adequate drainage system has to be provided to deal with overflow water.

7.15 Modification:

Replace the second sentence of the second paragraph with the following:

For **portable appliances** and **transportable whirlpool spas**, it shall be possible to remove or open this cover without the aid of a **tool**.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 Addition:

In addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.

8.1.4 Modification:

Replace the first paragraph with the following:

Any energized part is considered to be a **live part**.

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:

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 102 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of $4\text{ N} \pm 1\text{ N}$ to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

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

11.7 Modification:

Replace the first paragraph with the following:

Appliances are operated until steady conditions are established.

11.8 Modification:

Replace the first paragraph with the following:

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

Addition:

*If the appliance incorporates a heating element, the water temperature at the inlet of the **whirlpool bath** or **whirlpool spa** shall not exceed 50 °C and the water temperature at the suction opening/return point shall not exceed 43 °C.*

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

Surface ^a	Temperature rise of accessible external surfaces K
Bare metal	38
Coated metal ^b	42
Glass and ceramic	51
Plastic and plastic coating > 0,4 mm ^{c, d}	58
NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
^a Temperature rises are not measured on: – surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end; – the hot water supply fittings and hoses; – plumbing fittings, pressure relief valves and sight gauges; – surfaces that are submersed during normal operation. ^b Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used. ^c The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm. ^d When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.	

11.101 For **whirlpool baths** with a water heating function and **whirlpool spas** having a control that limits the average temperature of the water to max 40 °C, the control shall be set to its maximum temperature. The water temperature shall be measured at each water inlet and at each suction opening in the basin.

The average of the maximum water temperatures at any inlet and the maximum water temperatures at any suction opening shall not be greater than 40 °C, unless the instructions in 7.12 regarding hyperthermia are provided.

12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows:

13.1 Modification:

Replace the last paragraph with the following:

Protective impedance and radio interference filters are disconnected only before carrying out the tests of 13.3.

13.2 Modification:

Delete the third paragraph and replace the second paragraph by the following:

The leakage current is measured between any pole of the supply and:

- **accessible metal parts** intended to be connected to protective earth, for **class I appliances**;
- metal foil having an area not exceeding 20 cm × 10 cm which is in contact with **accessible surfaces** of insulating materials and metal parts not intended to be connected to protective earth, for **class II appliances**, **class II constructions** and **class III appliances**. The metal foil has the largest area possible on the surface under test without exceeding the dimensions specified. If its area is smaller than the surface under test, it is moved to test all parts of the surface. The heat dissipation of the appliance shall not be affected by the metal foil;
- for **class II appliances**, **class II constructions** and **class III appliances**, a metal electrode immersed in the water of the **whirlpool bath** or **whirlpool spa**. The metal electrode shall have dimensions of approximately 40 cm × 40 cm. The water used for this test shall be the saline solution used in 15.2, but without rinsing agent.

Addition:

For **class I transportable whirlpool spas**, the leakage current shall not exceed 0,75 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 Addition:

Traces of water on the insulation of parts supplied at **safety extra-low voltage** not exceeding 12 V are ignored.

15.1.2 Addition:

Whirlpool baths and **whirlpool spas** are tested without side panels fitted unless they are an integral part of the appliance.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows:

16.1 Modification:

Replace the penultimate paragraph with the following:

Protective impedance is disconnected from **live parts** only before carrying out the tests of 16.3.

16.2 Modification:

Add the following as a third dashed item in the first paragraph:

- *for **class II appliances, class II constructions and class III appliances**, a metal electrode immersed in the water of the **whirlpool bath** or **whirlpool spa**. The metal electrode shall have dimensions of approximately 40 cm × 40 cm. The water used for this test shall be the saline solution used in 15.2, but without rinsing agent.*

Delete the fifth paragraph starting with "The values specified above are doubled".

Addition:

*For **class I transportable whirlpool spas**, the leakage current shall not exceed 0,75 mA.*

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable except as follows.

Addition:

*The test is repeated with chlorinator cells loaded so that the current is 95 % of the lowest current that causes a **protective device** to operate. The test is continued until steady conditions are established.*

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.2 Addition:

*For appliances in which water is circulated, the **whirlpool bath** or **whirlpool spa** is filled and the appliance operated, after which it is switched off and the **whirlpool bath** or **whirlpool spa** emptied. Heating elements are then switched on, if possible, the pump being operated or at rest, whichever is more unfavourable.*

For appliances in which air is circulated, air inlets and outlets are blocked. Heating elements are then switched on, if possible, the blower being in operation.

19.7 Addition:

*The test is carried out with the **whirlpool bath** or **whirlpool spa** filled as specified for **normal operation**.*

19.13 Addition:

*The temperature at the inlet of **whirlpool baths** that have provisions for water heating and **whirlpool spas** shall not exceed 55 °C when measured in accordance with Clause 11.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable, except as follows.

20.2 Addition:

In addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Addition:

Whirlpool spas are also subjected to the impact test after the appliance has been maintained at a temperature of $-10\text{ }^{\circ}\text{C}$ for 24 h, unless they are intended for indoor use only.

If the appliance is too large for the conditioning room, parts of the appliance may be tested separately. In this case, the impact test is carried out immediately after the conditioning without reassembly.

*For water containers that provide protection against access to **live parts**, the value of the impact energy is 1 J.*

22 Construction

This clause of Part 1 is applicable except as follows.

22.33 Addition:

Conductive liquids may be in direct contact with **live parts** supplied at **safety extra-low voltage** not exceeding 12 V.

NOTE 101 This does not allow direct access to **live parts**, which is prohibited by application of Clause 8.

Parts mounted in the basin or in walls of the basin, such as lamps or luminaires, and parts accessible to the user in the **whirlpool bath** or **whirlpool spa**, such as switches and controls, shall only be supplied at **safety extra-low voltage** not exceeding 12 V.

Class III portable appliances and **class III whirlpool spas** shall have a **rated voltage** not exceeding 12 V.

22.101 Appliances in which air is circulated shall be constructed so that water cannot penetrate into the motor and come into contact with **live parts** or **basic insulation**.

Compliance is checked by the following test.

*The overflow outlet of **whirlpool baths** and **whirlpool spas** is blocked and the bath or spa is filled until water overflows. Non-return valves are rendered inoperative one at a time.*

*Separate appliances intended to be used with a conventional bath are placed on the floor, except that **portable mats** are placed in a bath filled with water. The mat is then raised to the most unfavourable position allowed by the construction of the appliance but to a height not exceeding 2 m. Non-return valves are rendered inoperative one at a time.*

The test is carried out with all possible methods of connecting the hose.

*After the test, there shall be no trace of water on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

22.102 Whirlpool baths shall be constructed so that the quantity of water that remains in the appliance after emptying the bath and is recirculated the next time the bath is used shall not exceed 0,5 l or 0,2 % of the capacity of the bath, whichever is less.

The capacity of the **whirlpool bath** is considered to be the volume of water required to fill the bath until water starts to flow through the overflow outlet.

Compliance is checked by any suitable method, such as measurements using chemical dilution, weighing or determination of volume.

22.103 Whirlpool baths and **whirlpool spas** shall be constructed so that hair cannot be drawn into apertures due to water suction if this could result in a hazard.

Compliance is checked by the following test.

*The appliance is filled as specified for **normal operation**.*

A mass of 50 g of medium or fine natural human hair is attached to a wooden rod having a diameter of 25 mm, the free length of hair being 400 mm. The rod shall have sufficient length for the hair to reach the suction opening. The hair is saturated for at least 2 min in the water.

*The free end of the hair is placed over the suction opening and the appliance operated while supplied at **rated voltage**. The hair is moved from side to side for up to 2,5 min in an attempt to get it sucked completely into the opening.*

The rod is pulled in order to withdraw the hair from the water and the pull force is measured with

- the rod pulled vertically;*
- the rod pulled at an angle of approximately 40° to the vertical.*

The force shall not exceed 20 N.

*If the **whirlpool bath** or **whirlpool spa** is provided with a **detachable cover** for the suction opening, the test is also carried out with the cover in place. During the test, the hair is used to sweep the cover in an attempt to displace it.*

The test is carried out five times.

*If the **whirlpool bath** or **whirlpool spa** has more than one suction opening, they are tested in turn. The hair is brushed periodically to keep it tangle free.*

22.104 Portable appliances and **transportable whirlpool spas** shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 20 mm.*

22.105 Whirlpool spas shall incorporate a water filtration system in order that the required level of water purity can be achieved. The filtration system does not have to automatically control the pH value of the water.

Compliance is checked by inspection.

22.106 For **class I whirlpool spas**, except parts of **class III construction** with a **working voltage** not exceeding 12 V, all metal parts that are in contact with water shall be connected to protective earth. The metal parts in contact with the water shall be resistant to corrosion.

For **class I transportable whirlpool spas** metal parts of heating elements that are in contact with water shall be separated from **live parts** by **double insulation** or **reinforced insulation** consisting of at least 3 layers. Other metal parts, except parts of **class III construction** with a **working voltage** not exceeding 12 V, that are in contact with the water shall be separated from **live parts** by **double insulation** or **reinforced insulation**.

Compliance is checked by inspection and the relevant tests.

22.107 Parts of **portable appliances** intended to be immersed in water shall be **class III construction** with a **working voltage** not exceeding 12 V.

Compliance is checked by inspection and the relevant tests.

23 Internal wiring

This clause of Part 1 is applicable.

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 shall not be **self-resetting thermal cut-outs** and shall have at least a type 1.E trip-free mechanism according to IEC 60730-1.

Compliance is checked by inspection.

24.102 Class III appliances shall be provided with a **safety isolating transformer** classified at least IPX4.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 Addition:

Class I appliances, other than **transportable whirlpool spas**, shall only be provided with means for permanent connection to fixed wiring.

Transportable whirlpool spas and **portable appliances** shall only be provided with a **supply cord** fitted with a plug. The **supply cord** shall have a length of at least 5 m and a maximum length of 8 m.

Portable appliances where the functional part is of **class III construction** supplied from a **detachable power supply part** shall have an **interconnection cord** having a length of at least 5 m. There is no limit on the length of the **supply cord** for the **detachable power supply part**.

25.5 *Addition:*

Type X attachments are not allowed for **transportable whirlpool spas**.

25.7 *Addition:*

Supply cords for **transportable whirlpool spas** shall not be lighter than rubber sheathed cords. Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57).

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.

27.2 *Addition:*

Class I appliances shall be provided with a terminal for the connection of external equipotential bonding conductors.

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.

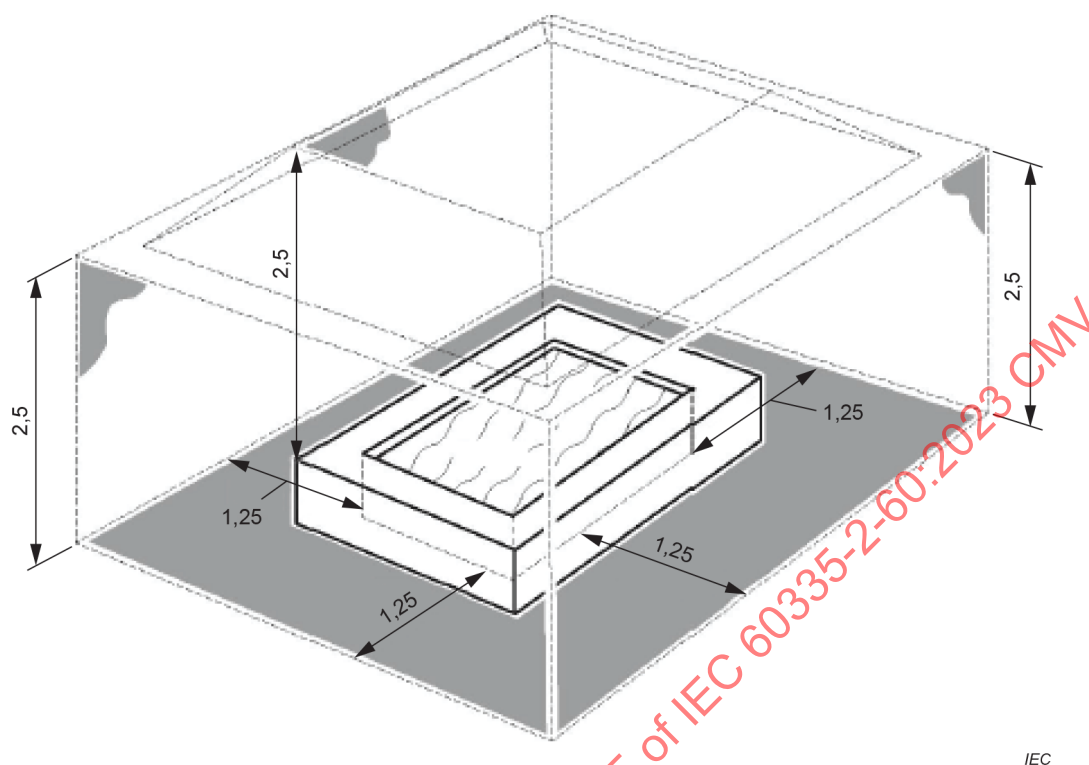
31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

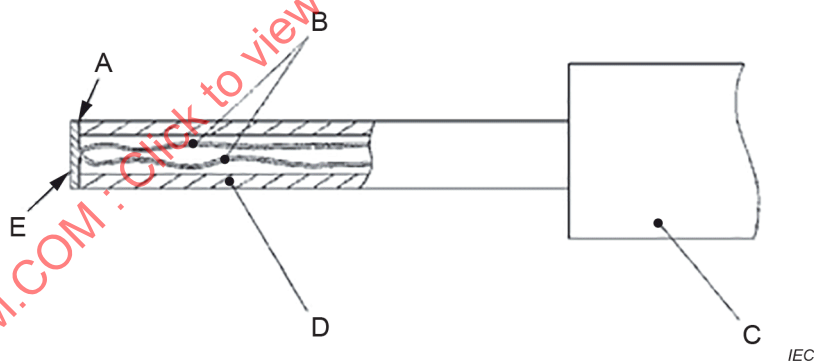
This clause of Part 1 is applicable.

Dimensions in metres



IEC

Figure 101 – Installation zone dimensions for transportable whirlpool spas



IEC

Key

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

Figure 102 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

Bibliography

The bibliography of Part 1 is applicable.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

SOMMAIRE

AVANT-PROPOS	24
INTRODUCTION.....	27
1 Domaine d'application	29
2 Références normatives	30
3 Termes et définitions	30
4 Exigences générales	31
5 Conditions générales d'essais	31
6 Classification	31
7 Marquage et instructions	32
8 Protection contre l'accès aux parties actives.....	33
9 Démarrage des appareils à moteur	33
10 Puissance et courant	34
11 Échauffements.....	34
12 Charge des batteries à ions métalliques	35
13 Courant de fuite et rigidité diélectrique à la température de régime	35
14 Surtensions transitoires	36
15 Résistance à l'humidité.....	36
16 Courant de fuite et rigidité diélectrique	36
17 Protection contre la surcharge des transformateurs et des circuits associés	37
18 Endurance	37
19 Fonctionnement anormal	37
20 Stabilité et dangers mécaniques	38
21 Résistance mécanique.....	38
22 Construction	38
23 Conducteurs internes.....	40
24 Composants	41
25 Raccordement au réseau et câbles souples extérieurs	41
26 Bornes pour conducteurs externes	41
27 Dispositions en vue de la mise à la terre	41
28 Vis et connexions	42
29 Distances dans l'air, lignes de fuite et isolation solide.....	42
30 Résistance à la chaleur et au feu.....	42
31 Protection contre la rouille	42
32 Rayonnement, toxicité et dangers analogues	42
Annexes	44
Bibliographie.....	45
Figure 101 – Dimensions de la zone d'installation pour les spas à système de brassage d'eau transportables	43
Figure 102 – Calibre pour le mesurage des températures de surface	43

Tableau 101 – Échauffements maximaux pour les surfaces accessibles extérieures spécifiées en conditions de fonctionnement normal.....	35
--	----

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-60: Exigences particulières pour les baignoires et les spas à système de brassage d'eau

AVANT-PROPOS

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse <https://patents.iec.ch>. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-60 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2017. Cette édition constitue une révision technique.

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

- a) le texte a été aligné sur l'IEC 60335-1:2020;
- b) certaines notes ont été converties en texte normatif (Article 1, 7.12.1);
- c) des instructions relatives à l'hyperthermie et des instructions relatives aux règles d'installation ont été ajoutées (7.12, 7.12.1);
- d) des modifications relatives à l'IEC 60364-7-702 et aux spas à système de brassage d'eau transportables ont été apportées (Article 1, 5.101, 6.1, 6.2, 7.12.1, 7.15, 13.1, 13.2, 16.1, 16.2, 22.33, 22.107, 25.1);
- e) des limites de température de surface ont été ajoutées (Article 11);
- f) une limite de température de l'eau au niveau des ouvertures d'aspiration/de retour a été ajoutée (11.8, 11.101);
- g) les essais du 19.2 et du 19.3 ont été modifiés pour spécifier les types de dispositifs qui sont rendus inopérants;
- h) une exigence qui spécifie que les coupe-circuits thermiques doivent être à déclenchement libre a été ajoutée (24.101).

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

Projet	Rapport de vote
61/7009/FDIS	61/7085/RVD

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

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

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

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

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

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

La présente partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les baignoires et les spas à système de brassage d'eau.

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

NOTE 2 Le système de numérotation suivant est utilisé:

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

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

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

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

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

- reconduit,
- supprimé, ou
- révisé.

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

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

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

IECNORM.COM : Click to view the full PDF of IEC 60335-2-60:2023 CMV

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-60: Exigences particulières pour les baignoires et les spas à système de brassage d'eau

1 Domaine d'application

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

La présente partie de l'IEC 60335 traite de la sécurité des **baignoires à système de brassage d'eau** électriques destinées à un usage intérieur et des **spas à système de brassage d'eau** électriques, destinés à un usage domestique et analogue, dont la **tension assignée** est inférieure ou égale à 250 V pour les appareils monophasés et à 480 V pour les autres appareils, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**.

La présente norme s'applique également aux appareils qui assurent une circulation d'air ou d'eau dans les baignoires conventionnelles.

La présente norme s'applique aux **baignoires à système de brassage d'eau** ou aux **spas à système de brassage d'eau** autonomes et montés en usine dans lesquels tous les dispositifs de commande et composants font partie intégrante de l'appareil et sont installés dans ou fixés à la structure de la **baignoire à système de brassage d'eau** ou du **spa à système de brassage d'eau**.

Les appareils non destinés à un usage domestique normal, mais qui peuvent néanmoins constituer une source de danger pour le public, tels que les appareils destinés à être utilisés par des usagers non avertis dans des hôtels, des centres de remise en forme et lieux analogues, sont compris dans le domaine d'application de la présente norme.

Dans la mesure du possible, la présente norme traite des dangers courants que présentent les appareils et auxquels sont exposés tous les individus situés à l'intérieur et autour de l'habitation. Cependant, elle ne tient en général pas compte:

- des personnes (y compris des enfants) dont
 - les capacités physiques, sensorielles ou mentales; ou
 - le manque d'expérience et de connaissanceles empêchent d'utiliser l'appareil en toute sécurité sans surveillance ou instruction;
- des enfants qui jouent avec l'appareil.

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 l'alimentation en eau, par les organismes nationaux responsables de la protection des travailleurs et par des organismes similaires.

La présente norme ne s'applique pas:

- aux matériels de circulation d'eau dans les piscines et dans les bassins pour la pratique d'exercices physiques;
- aux appareils de nettoyage des piscines;
- aux appareils destinés à des usages médicaux (série IEC 60601);
- aux **baignoires à système de brassage d'eau** ou aux **spas à système de brassage d'eau** installés à demeure, non autonomes et montés sur site, conçus spécialement pour un emplacement spécifique, qui sont assemblés ou construits sur le site d'installation final;
- aux appareils destinés à être utilisés dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz).

2 Références normatives

L'article de la Partie 1 s'applique, avec l'exception suivante.

Addition:

IEC 60584-1, *Couples thermoélectriques – Partie 1: Spécifications et tolérances en matière de FEM*

IEC 60364-7-701, *Installations électriques à basse tension – Partie 7-101: Exigences pour les installations et emplacements spéciaux – Emplacements contenant une baignoire ou une douche*

IEC 60364-7-702, *Installations électriques à basse tension – Partie 7-702: Exigences pour les installations ou emplacements spéciaux – Piscines et fontaines*

3 Termes et définitions

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

3.1 Définitions relatives aux caractéristiques physiques

3.1.9 *Modification:*

Remplacer le premier alinéa par ce qui suit:

fonctionnement de l'appareil dans les conditions suivantes:

Les **baignoires à système de brassage d'eau** destinées à un usage intérieur et les **spas à système de brassage d'eau** sont remplis d'eau jusqu'au niveau maximal admis par la construction.

Pour les appareils indépendants destinés à être utilisés dans une baignoire conventionnelle, la baignoire est remplie d'eau jusqu'à une hauteur d'environ 200 mm ou jusqu'au niveau maximal spécifié dans les instructions, si cette condition est plus défavorable.

3.5 Définitions relatives aux types d'appareils

3.5.1 *Addition:*

Note 101 à l'article: Les **spas à système de brassage d'eau transportables** ne sont pas considérés comme des **appareils mobiles**.

3.5.101**spa à système de brassage d'eau transportable**

spa à système de brassage d'eau destiné à être monté et déplacé de temps à autre afin d'être utilisé dans différents endroits

3.5.102**baignoire à système de brassage d'eau**

appareil utilisé par les personnes pour s'immerger dans l'eau, qui incorpore un dispositif destiné à souffler de l'air ou pour la circulation de l'eau et qui peut incorporer un dispositif pour le chauffage de l'eau, l'appareil étant prévu pour être vidé après utilisation

3.5.103**spa à système de brassage d'eau**

appareil utilisé simultanément par une ou plusieurs personnes pour s'immerger dans l'eau, qui incorpore un dispositif destiné à souffler de l'air ou pour la circulation de l'eau et un dispositif pour le chauffage de l'eau, l'appareil n'étant pas prévu pour être vidé après utilisation

3.6 Définitions relatives aux parties d'un appareil**3.6.4 Modification:**

Remplacer la Note 1 à l'article par ce qui suit:

Note 1 à l'article: Des parties sont considérées comme des **parties actives** même si elles sont conformes au 8.1.4.

4 Exigences générales

L'article de la Partie 1 s'applique.

5 Conditions générales d'essais

L'article de la Partie 1 s'applique, avec l'exception suivante.

5.7 Addition:

Si les essais sont influencés par la température de l'eau, celle-ci est maintenue à 40 °C ou à la valeur maximale admise par le dispositif de commande, si cette valeur est plus élevée.

6 Classification

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

6.1 Modification:

Remplacer le premier alinéa par ce qui suit:

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

Les **spas à système de brassage d'eau** doivent être de la **classe I** ou de la **classe III**.

Les **baignoires à système de brassage d'eau** et autres **appareils fixes** doivent être de la **classe I**, de la **classe II** ou de la **classe III**.

6.2 Addition:

Les **baignoirs à système de brassage d'eau** et les **spas à système de brassage d'eau** doivent procurer le degré de protection IPX5 au minimum. Les autres appareils doivent procurer le degré de protection IPX4 au minimum. Cette exigence ne s'applique pas aux parties des appareils, autres que les **spas à système de brassage d'eau transportables**, destinées à être montées à l'intérieur de l'habitation, mais en dehors des zones 0, 1 et 2 spécifiées dans l'IEC 60364-7-701 et l'IEC 60364-7-702.

7 Marquage et instructions

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

7.12 Addition:

Les instructions doivent fournir des détails concernant le nettoyage et les autres opérations d'entretien.

Les instructions pour les **appareils mobiles** doivent indiquer qu'aucune partie de l'appareil ne doit se trouver au-dessus du bain lors de l'utilisation.

Les instructions pour les **spas à système de brassage d'eau** doivent comporter des informations concernant:

- l'entretien de la pureté de l'eau, en particulier les valeurs du pH et les concentrations de chlore ou d'un autre agent de traitement recommandé;
- le nettoyage et la désinfection;
- l'utilisation et l'installation d'un couvercle;
- l'élimination de l'eau;
- les précautions pour éviter tout dommage du fait de la congélation de l'eau;
- les précautions pour éviter tout dommage lorsque l'appareil reste vide pendant une période prolongée.

Pour les **baignoirs à système de brassage d'eau** comportant une fonction de chauffage de l'eau et les **spas à système de brassage d'eau**, autres que ceux équipés d'un dispositif de commande permettant de limiter la température moyenne de l'eau à une valeur inférieure ou égale à 40 °C, mesurée conformément au 11.101, les instructions doivent comporter en substance l'indication suivante:

Afin d'éviter la possibilité d'occurrence d'une hyperthermie (stress thermique), il est recommandé que la température moyenne de l'eau ne dépasse pas 40 °C.

7.12.1 Addition:

Les instructions d'installation doivent indiquer en substance:

- que les parties qui comportent des parties actives, à l'exception de celles alimentées à une très basse tension de sécurité inférieure ou égale à 12 V, doivent être inaccessibles à une personne se trouvant dans la baignoire ou le spa;
- que les appareils reliés à la terre doivent être raccordés de façon permanente aux canalisations électriques fixes, à l'exception des spas à système de brassage d'eau transportables avec mise à la terre, qui doivent uniquement être branchés directement à un socle de prise de courant mis à la terre des canalisations électriques fixes;
- que les parties qui comportent des composants électriques, à l'exception des dispositifs de commande à distance, doivent être placées ou fixées de telle sorte qu'elles ne puissent pas tomber dans la baignoire ou le spa;