IEC 60335-2-109

Edition 1.0 2010-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety – Part 2-109: Particular requirements for UV radiation water treatment appliances

Appareils électrodomestiques et analogues – Sécurité – Partie 2-109: Règles particulières pour les appareils de traitement de l'eau par rayonnements ultraviolets

IEC 60335-2-109:2010

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

Q

ICS 13.120; 97.030

ISBN 978-2-88910-172-6

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CONTENTS

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

Table 101 – Weighting factors for different wavelengths ... 15

Documents
Document Sharing Hub

Full document details: IEC 60335-2-109 2010

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-109: Particular requirements for UV radiation water treatment appliances

FOREWORD

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This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

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

FDIS	Report on voting
61/3973/FDIS	61/4011/RVD

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

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

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This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) of that standard.

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

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for UV radiation water treatment appliances.

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

NOTE 2 The following numbering system is used:

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

NOTE 3 The following print types are used:

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

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

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.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

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

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

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INTRODUCTION

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

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

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

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

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

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

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

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

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

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-109: Particular requirements for UV radiation water treatment appliances

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of **UV radiation water treatment appliances** for household and similar purposes, their **rated voltage** being not more than 250 V.

Appliances not intended for normal household use but that nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops and in light industry and farms, 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 knowledge

  prevents 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 be necessary;
– in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

NOTE 102 This standard does not apply to

– pumps (IEC 60335-2-41);
– luminaires for aquariums (IEC 60598-2-11);
– luminaires for swimming pools and similar applications (IEC 60598-2-18);
– appliances intended exclusively for professional use;
– 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:

ISO 4892-2:2006, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*
Amendment 1 (2009)

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ISO 4892-4:2004, *Plastics – Methods of exposure to laboratory light sources – Part 4: Open-flame carbon-arc lamps*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation
operation of the appliance with water at the most onerous temperature specified in the instructions

3.101
UV-C emitter
radiating source constructed to emit non-ionizing electromagnetic energy at wavelengths of 100 nm to 280 nm

3.102
UV radiation water treatment appliance
appliance that treats water using electromagnetic energy at wavelengths in the ultraviolet band using **UV-C emitters**

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.

5.101 UV radiation water treatment appliances are tested as **motor-operated appliances**.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Addition:*

UV radiation water treatment appliances shall be **class I**, **class II** or **class III**.

Appliances immersed in water shall be c**lass III** with a **rated voltage** not exceeding 12 V or c**lass I**.

UV radiation water treatment appliances for use in swimming pools, when persons are in the pool, shall be **class III** with a **rated voltage** not exceeding 12 V.

6.2 *Addition:*

Appliances for use in water shall be IPX8.

Appliances for use above water shall be at least IPX7 unless they are intended to be fixed, in which case they shall be at least IPX1.

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Appliances intended to be used outdoors shall be at least IPX4.

NOTE The wiring rules applicable to installation of appliances in locations containing items such as baths, showers and swimming pools may require a higher IP rating.

These requirements do not apply to **class III appliances** having a **rated voltage** not exceeding 24 V.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

UV radiation water treatment appliances containing replaceable **UV-C emitters** shall be marked with the type reference of the emitter and with the substance of the following warning:

> WARNING: UV radiation is dangerous for the eyes and skin. Do not operate the UV-C emitter outside the appliance.

If it is intended that replacement of the **UV-C emitter** can be carried out by the user, the appliance shall be marked with “Read the instructions” or with symbol ISO 7000-0790 (2004-01).

The appliance shall be marked with the minimum and maximum water temperatures with which it can be used.

The appliance shall be marked with the rated pressure if the appliance is intended to be connected to a pressurized water system other than the water mains.

Appliances for use in water shall be marked with the maximum operating depth, if greater than 1 m.

7.6 *Addition:*

maximum operating depth

7.12 *Addition:*

The instructions for **UV radiation water treatment appliances** containing **UV-C emitters** shall contain the substance of the following:

> WARNING: Do not operate the UV-C emitter when it is removed from the appliance enclosure.

The instructions for **UV radiation water treatment appliances** containing **UV-C emitters** shall give details concerning

– the method, frequency of cleaning, and necessary precautions to be taken;
– precautions to be taken when replacing **UV-C emitters** and starters, if applicable.

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The instructions of appliances containing **UV-C emitters** shall contain the substance of the following:

– This appliance contains a **UV-C emitter**.
– Unintended use of the appliance or damage to the housing may result in the escape of dangerous UV-C radiation. UV-C radiation may, even in little doses, cause harm to the eyes and skin.
– Appliances that are obviously damaged must not be operated.
– If the replacement of the **UV-C emitter** by the user is not allowed, this must be clearly stated.

The instructions of appliances containing replaceable **UV-C emitters** shall also contain the substance of the following:

– Read the maintenance instructions before opening the appliance.
– The appliance must be disconnected from the supply before replacing the **UV-C emitter**.

The instructions for appliances intended to be used in aquariums, garden ponds and the like, except for those of **class III construction**, shall include the substance of the following:

WARNING: Disconnect the appliance from the supply before carrying out maintenance.

If symbol ISO 7000-0790 (2004-01) is used, its meaning shall be explained.

7.12.1 *Addition:*

The installation instructions shall state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

The installation instruction of **class III appliances** shall include details regarding the fixing and location of safety isolating transformers to prevent them from falling into the water or from being affected by water.

7.15 *Addition:*

The type reference of replaceable **UV-C emitters** shall be visible during their replacement.

8 Protection against access to live parts

This clause of Part 1 is applicable.

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.

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11.7 *Replacement:*

Appliances are operated until steady conditions are established.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable.

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Addition:*

UV radiation water treatment appliances *are also subjected to the tests of 19.101 and 19.102.*

19.13 *Addition:*

During and after the tests, the appliance shall comply with Clause 32.

19.101 ***UV radiation water treatment appliances*** *are operated under the conditions of Clause 11, but without water.*

19.102 ***UV radiation water treatment appliances*** *are operated under the fault conditions specified in items a), d) and e) of Subclause 12.5.1 of IEC 60598-1, the appliance being supplied at* ***rated voltage****.*

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