

**INTERNATIONAL
STANDARD**

**IEC
60335-2-55**

Third edition
2002-11

**Household and similar electrical appliances –
Safety –**

**Part 2-55:
Particular requirements for electrical appliances
for use with aquariums and garden ponds**

*Appareils électrodomestiques et analogues –
Sécurité –*

*Partie 2-55:
Règles particulières pour les appareils électriques
à utiliser avec les aquariums et les bassins de jardin*



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CONTENTS

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-55: Particular requirements for electrical appliances
for use with aquariums and garden ponds**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 1997. It constitutes a technical revision.

The text of this part of IEC 60335 is based on the following documents:

FDIS	Report on voting
61/2222/FDIS	61/2297/RVD

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

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) 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 electrical appliances for use with aquariums and garden ponds.

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

NOTE 2 The following numbering system is used:

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

NOTE 3 The following print types are used:

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

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

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

The following differences exist in the countries indicated below.

- 3.1.9: Normal operation is different (USA);
- 6.1: Class 0I appliances are allowed (Japan);
- 7.12.1: Additional instructions are required (USA);
- Clause 21: The tests are different (USA);
- 25.7: Ordinary polyvinyl chloride sheathed cords are allowed (Australia and New Zealand).

A bilingual version of this publication may be issued at a later date.

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.

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.

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.

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

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

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-55: Particular requirements for electrical appliances for use with aquariums and garden ponds

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric appliances for use with aquariums and garden ponds for household and similar purposes, their **rated voltage** being not more than 250 V.

NOTE 101 Examples of appliances within the scope of this standard are

- aerators;
- aquarium heaters;
- automatic food dispensers;
- sludge-suction appliances.

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

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTE 102 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 103 This standard does not apply to

- pumps (IEC 60335-2-41);
- other portable immersion heaters (IEC 60335-2-74);
- luminaires for aquariums and garden ponds (IEC 60598-2-18);
- appliances intended for outdoor use having a **rated power input** exceeding 100 W;
- 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.

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation

operation of the appliance under the following conditions

Aerators are operated with the outlet immersed in water at a depth of 1 m or at the maximum operating depth if this results in a higher power input.

Sludge-suction appliances are operated with the inlet immersed in water at a depth of 1 m or at the maximum operating depth if this results in a higher power input.

Automatic food dispensers are operated with the dispenser initially filled with the maximum quantity of food.

Heaters are operated in a sufficient quantity of water to maintain the water temperature between 20 °C and 25 °C without the **thermostat** cycling.

3.101

aerator

appliance that pumps air into the water in order to increase the oxygen content

3.102

sludge-suction appliance

hand-held appliance for removing deposits from aquariums or ponds

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.2 *Addition:*

NOTE 101 If the test of 21.103 has to be carried out, an additional sample is required.

6 Classification

This clause of Part 1 is applicable except as follows.

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 IPX4.

Other appliances shall be at least IPX4.

These requirements do not apply to **class III appliances**.


7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

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 shall include details regarding

- the operation of the appliance;
- the precautions to be taken for appliances not intended to be used in water;
- the maintenance of the appliance.

The instructions for appliances intended to be fully immersed in water shall state the maximum operating depth.

The instructions for appliances, other than **class III appliances**, shall include the substance of the following:

WARNING: Unplug or switch off all appliances in the aquarium or pond before carrying out maintenance.

7.12.1 Addition:

The installation instructions for appliances intended to be used above water shall include details regarding fixing, unless they are at least IPX7.

The installation instructions of appliances for outdoor use 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 instructions 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.

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.

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 except as follows.

15.1.2 Addition:

Appliances for use in water are immersed for 24 h in water containing approximately 1 % NaCl and having a temperature of $15\text{ °C} \pm 5\text{ °C}$. The appliance is immersed in its normal position of use so that

- its lowest point is located 1 m below the surface, for appliances having a height less than 0,85 m;*
- its highest point is located 0,15 m below the surface of the water, for other appliances.*

However, if the appliance is marked with a maximum operating depth, its lowest point shall be located at this depth.

*During immersion, the appliance is supplied at **rated voltage** and operated in cycles, each cycle consisting of 1 h on and 1 h off.*

15.3 Addition:

Appliances classified IPX8 are not subjected to this test.

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:

Aerators are also subjected to the test of 19.101.

19.2 Addition:

Heaters are operated in their normal position of use but without being immersed.

19.101 Aerators for use in water are supplied at **rated voltage** and operated under **normal operation** until steady conditions are established. Valves are rendered inoperative in turn and in any combination. After cooling down, the **aerator** is removed from the water.

Inspection shall show that water has not entered places where electrical components are located. The conditions of 19.13 are not applicable.

*Other aerators are supplied at **rated voltage** and operated for 5 min with the aerator and its outlet placed in the most unfavourable position with regard to the water level. Valves are rendered inoperative in turn and in any combination.*

NOTE The **aerator** is not placed in water.

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

Addition:

After the application of the impact hammer, aerators for use in water are subjected to the test of 21.101.

For aquarium heaters having a glass enclosure, the impact energy is reduced to 0,2 Nm and the blows are applied once to three points of the enclosure that are likely to be weak.

NOTE 101 Care is to be taken to ensure that the complete length of the glass enclosure is in contact with the polyamide sheet.

The heater is then subjected to the test of 21.102.

Class II appliances for use in water are subjected to the test of 21.103, which is carried out on a new appliance.

21.101 Aerators for use in water are operated at **rated voltage** while immersed in water at a depth of 1 m or at the maximum operating depth, whichever is greater, until steady conditions are established. The **aerator** is then switched off, allowed to cool down and removed from the water.

Inspection shall show that water has not entered places where electrical components are located.

21.102 *Heaters having a glass enclosure are fully immersed in water in the vertical position. The quantity of water in the vessel is between 0,33 l and 0,5 l for each watt of **rated power input**. The heater is supplied at **rated voltage** and operated so that the water temperature stabilizes between 20 °C and 25 °C. Water is then removed until half the length of the glass enclosure is exposed. When the heater is at maximum temperature during the cycle of operation of the thermal control, the vessel is refilled with water having a temperature of 15 °C ± 2 °C*

Inspection shall show that water has not entered places where electrical components are located.

NOTE This test is not applied to heaters intended to be placed on the bottom of the aquarium.

21.103 ***Class II appliances** for use in water are supplied at **rated voltage** and operated under **normal operation** until steady conditions are established.*

If the outer enclosure or its sealing means have been damaged during the impact test, they are made ineffective.

The appliance is then immersed in water containing approximately 1 % NaCl and having a temperature of 20 °C ± 5 °C. The highest point of the appliance is located 150 mm below the surface of the solution.

After 30 s, the leakage current is measured, as specified in 13.2, between any pole of the supply and a rectangular stainless steel electrode, having dimensions approximately 250 mm x 50 mm, placed in the solution.

The leakage current shall not exceed 3 mA.

22 Construction

This clause of Part 1 is applicable except as follows.

22.33 *Addition:*

Water is allowed to be in contact with **reinforced insulation** of aquarium heaters having a glass enclosure.

22.101 Appliances intended to be fixed above water shall be constructed so that they can be fixed securely to a support, unless they are classified at least IPX7.

Compliance is checked by inspection.

NOTE Keyhole slots, hooks, suction fasteners and similar means, without any further means to prevent the appliance from being inadvertently lifted off the support, are not considered to be adequate means for fixing the appliance securely.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.5 Addition:

Type X attachment is not allowed for appliances classified IPX7 or IPX8.

Type Z attachment is allowed.

25.7 Addition:

The **supply cord** of appliances intended for outdoor use, other than **class III appliances**, shall be polychloroprene sheathed cord and not be lighter than ordinary polychloroprene sheathed flexible cord (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.

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.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2 Addition:

*For **sludge-suction appliances**, 30.2.2 is applicable. For other appliances, 30.2.3 is 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.

Annexes

The annexes of Part 1 are applicable.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-41, *Household and similar electrical appliances – Safety – Part 2-41: Particular requirements for pumps.*

IEC 60335-2-74, *Household and similar electrical appliances – Safety – Part 2-74: Particular requirements for portable immersion heaters.*

IEC 60598-2-18, *Luminaires – Part 2: Particular requirements – Section 18: Luminaires for swimming pools and similar applications*



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