IEC 60335-2-59

Edition 4.0 2021-12
COMMENTED VERSION

INTERNATIONAL STANDARD

colour inside

Household and similar electrical appliances – Safety – Part 2-59: Particular requirements for insect killers

IEC 60335-2-59:2021-12 CMV(en)

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

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-59: Particular requirements for insect killers

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.
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This commented version (CMV) of the official standard IEC 60335-2-59:2021 edition 4.0 allows the user to identify the changes made to the previous IEC 60335-2-59:2002 +AMD1:2006+AMD2:2009 CSV edition 3.2. Futhermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes.

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 60335-2-59 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2002, Amendment 1:2006 and Amendment 2:2009. This edition constitutes a technical revision.

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

a) the text has been aligned with IEC 60335-1:2020;
b) some notes have been converted to normative text or deleted (Clause 1, 11.8, 16.101, 23.5);
c) temperature rise limits for accessible surface have been added (Clause 11).

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

Draft	Report on voting
61/6378/FDIS	61/6428/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/standardsdev/publications.

A list of all parts in the IEC 60335 series, published 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 insect killers.

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

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

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

The following differences exist in the countries indicated below.

– 6.1: Class 0 appliances for indoor use having a rated voltage not exceeding 150 V and class 0I appliances are allowed (Japan).

– Clause 22: The high voltage has to be obtained from an isolating transformer (Japan).

– Clause 22: Earthing of the secondary circuit of the transformer is not allowed (Japan).

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 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~~ publications, basic safety publications and group safety publications 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. **1**

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-59: Particular requirements for insect killers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **insect killers** for household and similar purposes, their **rated voltage** being not more than 250 V, including direct current (DC) supplied appliances and **battery-operated appliances**. 1

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 shops, in light industry and on 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~~ can 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

– appliances that function by emitting vaporized chemicals;
– appliances emitting ultrasonic waves;
– 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).

~~NOTE 103~~ For appliances provided with discharge lamps or tungsten filament lamps, IEC 60598-1 also applies as far as is reasonable.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

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

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

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*~~ *Addition:* **2**
~~**normal operation**~~
operation of the appliance under the following conditions:

– the output circuit is short-circuited;
– the grids are separated by the maximum distance for maintaining an arc, the appliance being operated in cycles consisting of 1 s of operation followed by a rest period of 2 s;
– a resistive load is connected between the grids and adjusted to obtain the maximum current

3.~~102~~1.101
effective irradiance
irradiance of electromagnetic radiation weighted according to a specific action curve

3.5 Definitions relating to types of appliances

3.5.101
insect killer
appliance that electrocutes insects by applying a voltage between two or more grids

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 *For each test, the most unfavourable condition specified in 3.1.9 is used.*

5.102 ***Insect killers*** *are tested as* ***motor-operated appliances****.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Insect killers shall be **class I** or **class II**.

6.2 *Addition:*

Insect killers intended for outdoor use shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Appliances shall be marked with symbol ~~5036 of IEC 60417-1~~ IEC 60417-5036 (2002-10) or with the substance of the following:

DANGER: High voltage

Appliances provided with replaceable lamps shall be marked with the type reference of the lamp.

Appliances containing lamps that cannot be replaced without breaking or destroying the appliance shall be marked with the substance of the following:

WARNING: The lamps in this appliance cannot be replaced. Scrap the appliance when the lamps cease to operate.

7.6 *Addition:*

~~[symbol 5036 of IEC 60417-1] dangerous voltage~~

[symbol IEC 60417-5036 (2002-10)] dangerous voltage

7.12 *Addition:*

The instructions shall state whether the appliance is for indoor use only or suitable for outdoor use.

The instructions for appliances for indoor use only shall state that they are not suitable for use in barns, stables and similar locations.

The instructions for appliances intended for outdoor use shall include the substance of the following:

WARNING: An electric shock hazard may exist if water from a garden hose is directed at the insect killer.

When using extension cords, keep the socket-outlet away from moisture and avoid damage to the cord.

The instructions shall state the substance of the following:

– the appliance is to be kept out of reach of children;
– the appliance is not to be used in locations where flammable vapour or explosive dust is likely to exist.

The instructions shall give details concerning

– the method and frequency of cleaning, together with the precautions to be taken;
– precautions to be taken when replacing lamps and starters, if applicable.

If symbol ~~5036 of IEC 60417-1~~ IEC 60417-5036 (2002-10) is used, its meaning shall be explained.

7.14 *Addition:*

The height of symbol ~~5036 of IEC 60417-1~~ IEC 60417-5036 (2002-10) shall be at least 10 mm.

The height of the lettering of the warning relating to high voltage shall be at least 3 mm.

Compliance is checked by measurement.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 *Modification:*

Test probe 18 of IEC 61032 is not applied to appliances that according to the instructions are required to be mounted at a height exceeding 1,8 m above the floor. **3**

Addition:

When the grid voltage is obtained from an isolating transformer, the test probe may touch earthed parts of the secondary circuit.

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 101 is used to measure the temperature rises of external* ***accessible surfaces*** *specified in Table 101. The probe is applied with a force of 4 N ± 1 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. **4**

11.7 ~~*Replacement*~~ *Modification:* **5**

For appliances incorporating ***integral batteries*** *or* ***separable batteries*** *not disconnected from the appliance for charging purposes, the* ***battery*** *that has been* ***fully discharged*** *is charged for 1 h, while the appliance is operated performing its intended function as specified for normal operation, if allowed by the construction of the appliance.*

Addition:

Appliances are operated until steady conditions are established.

11.8 *Modification:*

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101. **4**

Addition:

The temperature rise of handles or grips of vents and air shutters shall not exceed the value specified in Table 3 for surfaces of handles, knobs, grips and similar parts which are held for short periods only in normal use.

The temperature rise of surfaces likely to collect dust or insects shall not exceed 60 K.

~~NOTE 101~~ *Surfaces having an inclination of at least 60° to the horizontal and parts having a diameter less than 10 mm are not considered likely to collect dust or insects.*

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

Surface	*Temperature rise of external accessible surfaces* [a] *K*
Bare metal	*42*
Coated metal [b]	*49*
Glass and ceramic	*56*
Plastic and plastic coating > 0,4 mm [c, d]	*62*
NOTE 101 The temperature rise limits of knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
[a] *Temperature rises on surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end, applied with a force not exceeding 1 N are not measured.*	
[b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel 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.*	

12 ~~Void~~ Charging of metal-ion batteries **1**

This clause of Part 1 is applicable.

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 *Addition:*

Water on the grids is ignored.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.101 The transformer shall have adequate internal insulation.

Compliance is checked by the following test.

*Twice the **working voltage** is induced in the secondary winding of the transformer by applying a sinusoidal voltage having a frequency higher than **rated frequency** to the primary terminals.*

The duration of the test is

– *60 s, for frequencies up to twice the **rated frequency**, or*

– $120 \times \frac{\textbf{rated frequency}}{\text{test frequency}}$ *s, with a minimum of 15 s, for higher frequencies.*

NOTE The frequency of the test voltage is higher than the **rated frequency** to avoid excessive excitation current.

A maximum of one-third of the test voltage is applied and is then rapidly increased without creating transients. At the end of the test, the voltage is decreased in a similar manner to approximately one-third of its full value before switching off.

There shall be no breakdown between windings or between adjacent turns of the same winding.

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.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Modification:*

Test probe 18 of IEC 61032 is not applied to appliances that according to the instructions are required to be mounted at a height exceeding 1,8 m above the floor. 3

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 *Addition:*

Drain holes shall be at least 5 mm in diameter or 20 mm^2 in area with a width of at least 3 mm.

22.101 Interlock switches that prevent access to **live parts** during **user maintenance** shall be connected in the input circuit and located to prevent unintentional operation.

Compliance is checked by inspection and by applying test probe B of IEC 61032 with a force of 10 N. 6

22.102 Appliances having grids in the form of horizontal bars, and one pole of the output of the transformer connected to **accessible parts**, shall have the lowest bar connected to earth.

Compliance is checked by inspection.

22.103 Appliances shall be constructed so that there is no risk of electric shock when touching the grids during **user maintenance**.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage**. It is then disconnected from the supply mains. 1 s after disconnection, the voltage between the grids is measured with an instrument that does not appreciably affect the value to be measured.*

The voltage shall not exceed 34 V.

22.104 The short-circuit current of the output circuit shall not be excessive.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage**. The short-circuit current is measured between both grids and between each grid and earth.*

The current shall not exceed 10 mA.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.5 *Addition:*

For circuits having a voltage over 1 000 V, the test voltage is $\left(\sqrt{2}U+750\right)$ *V and is applied for 1 min where* U *is the peak value of the* ***working voltage.***

~~NOTE 101 *U* is the peak value of the working voltage.~~

~~NOTE 102 The test is only carried out in case of doubt.~~

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 *Addition:*

Interlock switches are operated 1 000 times.

24.2 *Addition:*

Appliances for indoor use only may be fitted with switches in flexible cords.

24.101 Interlock switches that prevent access to **live parts** during **user maintenance** shall

– disconnect all poles, unless the secondary circuit is supplied through an isolating transformer;
– have a contact separation that provides full disconnection in accordance with IEC 61058-1.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.7 *Addition:*

Supply cords of appliances intended for outdoor use, and of appliances having a lamp emitting ultra-violet radiation, shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed 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 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, fire and tracking

This clause of Part 1 is applicable except as follows.

30.2.2 Not applicable.

30.101 Parts of non-metallic material enclosing or supporting the grids, and non-metallic trays intended to collect insects, shall be resistant to fire. This also applies to parts within 50 mm above the tray.

Printed boards in the output circuit having a surface area exceeding 25 cm2 shall be resistant to fire, unless they are contained in a metal enclosure.

Compliance is checked by the needle-flame test of Annex E.

The needle-flame test is not carried out on parts of material classified as V-0 or V-1 according to IEC 60695-11-10, provided that the sample tested was not thicker than the relevant part.

31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

Addition:

For appliances intended for outdoor use, compliance is checked by the salt mist test of IEC 60068-2-52, ~~severity~~ test method 2 being applicable.

Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing the pin along the surface of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.

After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clause 8 and Clause 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

Addition:

For appliances incorporating lamps emitting UV radiation, compliance is checked by the following test.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The irradiance is measured at a distance of 1 m, the measuring instrument being positioned so that the highest radiation is recorded.*

NOTE 101 The measuring instrument used measures the mean irradiance over a circular area having a diameter not exceeding 20 mm. The response of the instrument is proportional to the cosine of the angle between incident radiation and the normal to the circular area. The spectral distribution is measured at intervals of 1 nm by means of a spectrophotometer having a bandwidth not exceeding 2,5 nm.

NOTE 102 The total **effective irradiance** is given by

$$E = \sum_{250\,\text{nm}}^{400\,\text{nm}} S_\lambda E_\lambda \Delta\lambda$$

where

E is the effective irradiance;

S_λ is the weighting factor specified in ~~Table 101~~ Table 102;

E_λ is the spectral irradiance in W/(m^{2}nm);

$\Delta\lambda$ is the bandwidth in nm.

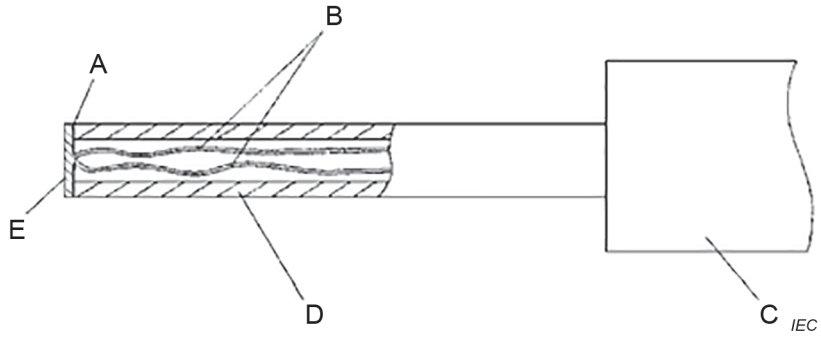
*The irradiance is measured when the radiation from the lamp has stabilized. The **effective irradiance** for each wavelength is calculated taking into account the weighting factors specified in ~~Table 101~~ Table 102.*

*The total **effective irradiance** is determined and shall not exceed 1 mW/m^2.*

Table ~~101~~ 102 – Weighting factors for different wavelengths

Wavelength nm	Weighting factor (S_λ)	Wavelength nm	Weighting factor (S_λ)	Wavelength nm	Weighting factor (S_λ)
250	0,430	308	0,026	335	0, 000 34
254	0,500	310	0,015	340	0,000 28
255	0,520	313	0,006	345	0,000 24
260	0,650	315	0,003	350	0,000 20
265	0,810	316	0,002 4	355	0,000 16
270	1,000	317	0,002 0	360	0,000 13
275	0,960	318	0,001 6	365	0,000 11
280	0,880	319	0,001 2	370	0,000 093
285	0,770	320	0,001 0	375	0,000 077
290	0,640	322	0,000 67	380	0,000 064
295	0,540	323	0,000 54	385	0,000 053
297	0,460	325	0,000 50	390	0,000 044
300	0,300	328	0,000 44	395	0,000 036
303	0,120	330	0,000 41	400	0,000 030
305	0,060	333	0,000 37		

NOTE The weighting factors for intermediate wavelengths are determined by interpolation.



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 N ± 1 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 101 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable except as follows.

Annex B
(normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

B.11.1 *Modification:*

*For appliances incorporating **integral batteries** or **separable batteries** not disconnected from the appliance for charging purposes, and that cannot perform their intended function while the **batteries** are being charged, the appliance is operated until it cannot perform its intended function due to the depletion of the **batteries**.* 7

Bibliography

The bibliography of Part 1 is applicable ~~except as follows~~.

~~*Addition:*~~

~~ISO 13732-1, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*~~

List of comments

1 This revision is for alignment with IEC 60335-1:2020.

2 This revision maintains the normal operation while charging as specified in IEC 60335-1:2020.

3 Appliances located above 1,8 m are not considered to be within reach of children, so test probe 18 is not applied.

4 Limits on the temperature rise of external accessible surfaces are introduced to address the risk of thermal injury from contact with external accessible surfaces.

5 This revision maintains the test duration while charging as specified in IEC 60335-1:2020.

6 Due to the addition of 5.21 in the Part 1, the force applied to test probe B is specified to align with that specified in IEC 61032.

7 The test specification was modified from IEC 60335-1:2020 to align with anticipated normal use of battery-operated insect killers.

IEC 60335-2-59

Edition 4.0 2021-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety – Part 2-59: Particular requirements for insect killers

Appareils électrodomestiques et analogues – Sécurité – Partie 2-59: Exigences particulières pour les destructeurs d'insectes

IEC 60335-2-59:2021-11(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-59: Particular requirements for insect killers

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.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60335-2-59 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2002, Amendment 1:2006 and Amendment 2:2009. This edition constitutes a technical revision.

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

a) the text has been aligned with IEC 60335-1:2020;
b) some notes have been converted to normative text or deleted (Clause 1, 11.8, 16.101, 23.5);
c) temperature rise limits for accessible surface have been added (Clause 11).

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

Draft	Report on voting
61/6378/FDIS	61/6428/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/standardsdev/publications.

A list of all parts in the IEC 60335 series, published 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 insect killers.

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

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

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

The following differences exist in the countries indicated below.

– 6.1: Class 0 appliances for indoor use having a rated voltage not exceeding 150 V and class 0I appliances are allowed (Japan).

– Clause 22: The high voltage has to be obtained from an isolating transformer (Japan).

– Clause 22: Earthing of the secondary circuit of the transformer is not allowed (Japan).

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 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 publications and group safety publications 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 2-59: Particular requirements for insect killers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **insect killers** for household and similar purposes, their **rated voltage** being not more than 250 V, including direct current (DC) supplied appliances and **battery-operated appliances**.

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 shops, in light industry and on 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.

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 authorities responsible for the protection of labour and similar authorities.

This standard does not apply to

– appliances that function by emitting vaporized chemicals;
– appliances emitting ultrasonic waves;
– 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).

For appliances provided with discharge lamps or tungsten filament lamps, IEC 60598-1 also applies as far as is reasonable.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

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

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

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 *Addition:*
operation of the appliance under the following conditions:

– the output circuit is short-circuited;
– the grids are separated by the maximum distance for maintaining an arc, the appliance being operated in cycles consisting of 1 s of operation followed by a rest period of 2 s;
– a resistive load is connected between the grids and adjusted to obtain the maximum current

3.1.101
effective irradiance
irradiance of electromagnetic radiation weighted according to a specific action curve

3.5 Definitions relating to types of appliances

3.5.101
insect killer
appliance that electrocutes insects by applying a voltage between two or more grids

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 *For each test, the most unfavourable condition specified in 3.1.9 is used.*

5.102 ***Insect killers*** *are tested as* ***motor-operated appliances****.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Insect killers shall be **class I** or **class II**.

6.2 *Addition:*

Insect killers intended for outdoor use shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Appliances shall be marked with symbol IEC 60417-5036 (2002-10) or with the substance of the following:

DANGER: High voltage

Appliances provided with replaceable lamps shall be marked with the type reference of the lamp.

Appliances containing lamps that cannot be replaced without breaking or destroying the appliance shall be marked with the substance of the following:

WARNING: The lamps in this appliance cannot be replaced. Scrap the appliance when the lamps cease to operate.

7.6 *Addition:*

[symbol IEC 60417-5036 (2002-10)] dangerous voltage

7.12 *Addition:*

The instructions shall state whether the appliance is for indoor use only or suitable for outdoor use.

The instructions for appliances for indoor use only shall state that they are not suitable for use in barns, stables and similar locations.

The instructions for appliances intended for outdoor use shall include the substance of the following:

WARNING: An electric shock hazard may exist if water from a garden hose is directed at the insect killer.

When using extension cords, keep the socket-outlet away from moisture and avoid damage to the cord.

The instructions shall state the substance of the following:

– the appliance is to be kept out of reach of children;
– the appliance is not to be used in locations where flammable vapour or explosive dust is likely to exist.

The instructions shall give details concerning

– the method and frequency of cleaning, together with the precautions to be taken;
– precautions to be taken when replacing lamps and starters, if applicable.

If symbol IEC 60417-5036 (2002-10) is used, its meaning shall be explained.

7.14 *Addition:*

The height of symbol IEC 60417-5036 (2002-10) shall be at least 10 mm.

The height of the lettering of the warning relating to high voltage shall be at least 3 mm.

Compliance is checked by measurement.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 *Modification:*

Test probe 18 of IEC 61032 is not applied to appliances that according to the instructions are required to be mounted at a height exceeding 1,8 m above the floor.

Addition:

When the grid voltage is obtained from an isolating transformer, the test probe may touch earthed parts of the secondary circuit.

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 101 is used to measure the temperature rises of external* ***accessible surfaces*** *specified in Table 101. The probe is applied with a force of 4 N ± 1 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:*

For appliances incorporating ***integral batteries*** *or* ***separable batteries*** *not disconnected from the appliance for charging purposes, the* ***battery*** *that has been* ***fully discharged*** *is charged for 1 h, while the appliance is operated performing its intended function as specified for normal operation, if allowed by the construction of the appliance.*

Addition:

Appliances are operated until steady conditions are established.

11.8 *Modification:*

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

Addition:

The temperature rise of handles or grips of vents and air shutters shall not exceed the value specified in Table 3 for surfaces of handles, knobs, grips and similar parts which are held for short periods only in normal use.

The temperature rise of surfaces likely to collect dust or insects shall not exceed 60 K. Surfaces having an inclination of at least 60° to the horizontal and parts having a diameter less than 10 mm are not considered likely to collect dust or insects.

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

Surface	***Temperature rise of external accessible surfaces*** [a] ***K***
Bare metal	*42*
Coated metal [b]	*49*
Glass and ceramic	*56*
Plastic and plastic coating > 0,4 mm [c, d]	*62*
NOTE 101 The temperature rise limits of knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
[a] *Temperature rises on surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end, applied with a force not exceeding 1 N are not measured.* [b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel 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.*	

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.

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:*

Water on the grids is ignored.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.101 The transformer shall have adequate internal insulation.

Compliance is checked by the following test.

*Twice the **working voltage** is induced in the secondary winding of the transformer by applying a sinusoidal voltage having a frequency higher than **rated frequency** to the primary terminals.*

The duration of the test is

– *60 s, for frequencies up to twice the **rated frequency**, or*

– $120 \times \frac{\textbf{rated frequency}}{\text{test frequency}}$ *s, with a minimum of 15 s, for higher frequencies.*

NOTE The frequency of the test voltage is higher than the **rated frequency** to avoid excessive excitation current.

A maximum of one-third of the test voltage is applied and is then rapidly increased without creating transients. At the end of the test, the voltage is decreased in a similar manner to approximately one-third of its full value before switching off.

There shall be no breakdown between windings or between adjacent turns of the same winding.

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.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Modification:*

Test probe 18 of IEC 61032 is not applied to appliances that according to the instructions are required to be mounted at a height exceeding 1,8 m above the floor.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 *Addition:*

Drain holes shall be at least 5 mm in diameter or 20 mm^2 in area with a width of at least 3 mm.

22.101 Interlock switches that prevent access to **live parts** during **user maintenance** shall be connected in the input circuit and located to prevent unintentional operation.

Compliance is checked by inspection and by applying test probe B of IEC 61032 with a force of 10 N.

22.102 Appliances having grids in the form of horizontal bars, and one pole of the output of the transformer connected to **accessible parts**, shall have the lowest bar connected to earth.

Compliance is checked by inspection.

22.103 Appliances shall be constructed so that there is no risk of electric shock when touching the grids during **user maintenance**.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage**. It is then disconnected from the supply mains. 1 s after disconnection, the voltage between the grids is measured with an instrument that does not appreciably affect the value to be measured.*

The voltage shall not exceed 34 V.

22.104 The short-circuit current of the output circuit shall not be excessive.

Compliance is checked by the following test.

*The appliance is supplied at **rated voltage**. The short-circuit current is measured between both grids and between each grid and earth.*

The current shall not exceed 10 mA.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.5 *Addition:*

For circuits having a voltage over 1 000 V, the test voltage is $\left(\sqrt{2}U+750\right)$ *V and is applied for 1 min where* U is the peak value of the **working voltage**.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 *Addition:*

Interlock switches are operated 1 000 times.

24.2 *Addition:*

Appliances for indoor use only may be fitted with switches in flexible cords.

24.101 Interlock switches that prevent access to **live parts** during **user maintenance** shall

– disconnect all poles, unless the secondary circuit is supplied through an isolating transformer;
– have a contact separation that provides full disconnection in accordance with IEC 61058-1.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.7 *Addition:*

Supply cords of appliances intended for outdoor use, and of appliances having a lamp emitting ultra-violet radiation, shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed 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 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, fire and tracking

This clause of Part 1 is applicable except as follows.

30.2.2 Not applicable.

30.101 Parts of non-metallic material enclosing or supporting the grids, and non-metallic trays intended to collect insects, shall be resistant to fire. This also applies to parts within 50 mm above the tray.

Printed boards in the output circuit having a surface area exceeding 25 cm^2 shall be resistant to fire, unless they are contained in a metal enclosure.

Compliance is checked by the needle-flame test of Annex E.

The needle-flame test is not carried out on parts of material classified as V-0 or V-1 according to IEC 60695-11-10, provided that the sample tested was not thicker than the relevant part.

31 Resistance to rusting

This clause of Part 1 is applicable except as follows.

Addition:

For appliances intended for outdoor use, compliance is checked by the salt mist test of IEC 60068-2-52, test method 2 being applicable.

Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0,5 N. The scratches are made by drawing the pin along the surface of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.

After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clause 8 and Clause 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

Addition:

For appliances incorporating lamps emitting UV radiation, compliance is checked by the following test.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The irradiance is measured at a distance of 1 m, the measuring instrument being positioned so that the highest radiation is recorded.*

NOTE 101 The measuring instrument used measures the mean irradiance over a circular area having a diameter not exceeding 20 mm. The response of the instrument is proportional to the cosine of the angle between incident

radiation and the normal to the circular area. The spectral distribution is measured at intervals of 1 nm by means of a spectrophotometer having a bandwidth not exceeding 2,5 nm.

NOTE 102 The total **effective irradiance** is given by

$$E = \sum_{250\,\text{nm}}^{400\,\text{nm}} S_\lambda E_\lambda \Delta\lambda$$

where

E is the effective irradiance;

S_λ is the weighting factor specified in Table 102;

E_λ is the spectral irradiance in W/(m^{2}nm);

$\Delta\lambda$ is the bandwidth in nm.

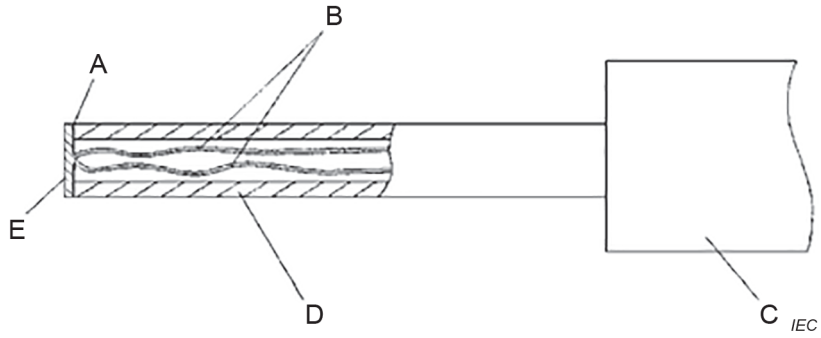
*The irradiance is measured when the radiation from the lamp has stabilized. The **effective irradiance** for each wavelength is calculated taking into account the weighting factors specified in Table 102.*

*The total **effective irradiance** is determined and shall not exceed 1 mW/m^2.*

Table 102 – Weighting factors for different wavelengths

Wavelength nm	Weighting factor (S_λ)	Wavelength nm	Weighting factor (S_λ)	Wavelength nm	Weighting factor (S_λ)
250	0,430	308	0,026	335	0,000 34
254	0,500	310	0,015	340	0,000 28
255	0,520	313	0,006	345	0,000 24
260	0,650	315	0,003	350	0,000 20
265	0,810	316	0,002 4	355	0,000 16
270	1,000	317	0,002 0	360	0,000 13
275	0,960	318	0,001 6	365	0,000 11
280	0,880	319	0,001 2	370	0,000 093
285	0,770	320	0,001 0	375	0,000 077
290	0,640	322	0,000 67	380	0,000 064
295	0,540	323	0,000 54	385	0,000 053
297	0,460	325	0,000 50	390	0,000 044
300	0,300	328	0,000 44	395	0,000 036
303	0,120	330	0,000 41	400	0,000 030
305	0,060	333	0,000 37		

NOTE The weighting factors for intermediate wavelengths are determined by interpolation.



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 N ± 1 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 101 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable except as follows.

Annex B
(normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

B.11.1 *Modification:*

*For appliances incorporating **integral batteries** or **separable batteries** not disconnected from the appliance for charging purposes, and that cannot perform their intended function while the **batteries** are being charged, the appliance is operated until it cannot perform its intended function due to the depletion of the **batteries**.*

Bibliography

The bibliography of Part 1 is applicable.

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-59: Exigences particulières pour les destructeurs d'insectes

AVANT-PROPOS

1) La Commission Electrotechnique 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. A 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.
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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'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-59 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 quatrième édition annule et remplace la troisième édition parue en 2002, l'Amendement 1:2006 et l'Amendement 2:2009. Cette édition constitue une révision technique.

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

a) alignement du texte sur l'IEC 60335-1:2020;
b) conversion en texte normatif ou suppression de certaines notes (Article 1, 11.8, 16.101, 23.5);
c) ajout de limites d'échauffement pour les surfaces accessibles (Article 11).

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

Projet	Rapport de vote
61/6378/FDIS	61/6428/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/standardsdev/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 destructeurs d'insectes.

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. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

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 entériné au niveau national au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

Les différences suivantes existent dans les pays indiqués ci-après.

– 6.1: les appareils de la classe 0 destinés à un usage en intérieur et dont la tension assignée est inférieure ou égale à 150 V et les appareils de la classe 0I sont admis (Japon);

– Article 22: la haute tension doit être délivrée par un transformateur de séparation (Japon);

– Article 22: la mise à la terre du circuit secondaire du transformateur n'est pas admise (Japon).

INTRODUCTION

Il a été considéré en établissant cette 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 n'a pas pour objet de remplacer le 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.

Cette 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 est applicable, on tient compte de l'influence d'une fonction sur les autres fonctions.

Lorsqu'une Partie 2 ne comporte pas d'exigences complémentaires pour couvrir les risques 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.

Cette 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 publications fondamentales de sécurité et les publications groupées de sécurité couvrant un risque ne sont pas applicables 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 cette norme peut être examiné et essayé 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 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.

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-59: Exigences particulières pour les destructeurs d'insectes

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 **destructeurs d'insectes** électriques destinés à un usage domestique et analogue, dont la **tension assignée** est inférieure ou égale à 250 V, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**.

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 magasins, chez des artisans et dans des fermes, 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, cette norme ne tient pas compte en général:

– des personnes (y compris des enfants) dont:
  - les capacités physiques, sensorielles ou mentales; ou
  - le manque d'expérience et de connaissance

  les empêchent d'utiliser l'appareil en toute sécurité sans surveillance ou instruction;
– de l'utilisation de l'appareil comme jouet par des enfants.

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 la protection des travailleurs et par des organismes similaires.

La présente norme ne s'applique pas

– aux appareils qui fonctionnent par diffusion de substances chimiques;
– aux appareils qui émettent des ultrasons;
– 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).

Pour les appareils qui comportent des lampes à décharge ou des lampes à filaments de tungstène, l'IEC 60598-1 s'applique également, pour autant que cela soit raisonnable.

2 Références normatives

L'article de la Partie 1 est applicable, avec l'exception suivante.

Addition:

IEC 60068-2-52, *Essais d'environnement – Partie 2-52: Essais – Essai Kb: Brouillard salin, essai cyclique (solution de chlorure de sodium)*

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

3 Termes et définitions

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

3.1 Définitions relatives aux caractéristiques physiques

3.1.9 *Addition:*
fonctionnement de l'appareil dans les conditions suivantes:

– le circuit de sortie est mis en court-circuit;
– les grilles sont écartées selon la distance maximale qui permet le maintien d'un arc, l'appareil étant mis en fonctionnement par cycles constitués d'une période de fonctionnement de 1 s suivie d'une période de repos de 2 s;
– une charge résistive est connectée entre les grilles et réglée de façon à obtenir le courant maximal

3.1.101
éclairement effectif
éclairement de rayonnement électromagnétique pondéré selon une courbe d'action spécifique

3.5 Définitions relatives aux types d'appareils

3.5.101
destructeur d'insectes
appareil qui électrocute les insectes par l'application d'une tension entre deux ou plusieurs grilles

4 Exigences générales

L'article de la Partie 1 est applicable.

5 Conditions générales d'essais

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

5.101 *Pour chaque essai, la condition la plus défavorable spécifiée en 3.1.9 est utilisée.*

5.102 *Les **destructeurs d'insectes** sont soumis à l'essai comme des **appareils à moteur**.*

6 Classification

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

6.1 *Modification:*

Les **destructeurs d'insectes** doivent être de la **classe I** ou de la **classe II**.

6.2 *Addition:*

Les **destructeurs d'insectes** destinés à un usage en extérieur doivent être au moins IPX4.

7 Marquage et instructions

L'article de la Partie 1 est applicable, avec les exceptions suivantes.

7.1 *Addition:*

Les appareils doivent être marqués du symbole IEC 60417-5036 (2002-10) ou doivent porter en substance l'indication suivante:

DANGER: Haute tension

Les appareils équipés de lampes remplaçables doivent comporter un marquage de la référence du type de la lampe.

Les appareils équipés de lampes qui ne peuvent pas être remplacées sans casser ou détruire l'appareil doivent porter un marquage qui comporte en substance l'indication suivante:

MISE EN GARDE: Les lampes de cet appareil ne peuvent pas être remplacées. Mettre l'appareil au rebut lorsque les lampes ne fonctionnent plus.

7.6 *Addition:*

[symbole IEC 60417-5036 (2002-10)] Tension dangereuse

7.12 *Addition:*

Les instructions doivent indiquer si l'appareil est destiné à être utilisé en intérieur uniquement ou s'il convient à une utilisation en extérieur.

Les instructions des appareils destinés à un usage en intérieur uniquement doivent indiquer qu'ils ne conviennent pas à une utilisation dans des granges, étables et locaux analogues.

Les instructions pour les appareils destinés à être utilisés en extérieur doivent comporter en substance les indications suivantes:

MISE EN GARDE: Il peut exister un danger de choc électrique si l'eau d'un tuyau d'arrosage est dirigée sur le destructeur d'insectes.

Lors de l'utilisation de cordons prolongateurs, maintenir la prise de courant au sec et éviter d'endommager le câble.