

BRITISH STANDARD

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60335-2-59 :
1998
IEC 60335-2-59 :
1997**

Safety of household and similar electrical appliances

Part 2. Particular requirements

Section 2.59 Insect killers

The European Standard EN 60335-2-59 : 1997 has the status of a
British Standard

ICS 97.180

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National foreword

This British Standard is the English language version of EN 60335-2-59 : 1997. It is identical with IEC 60335-2-59 : 1997. It supersedes BS EN 60335-2-59 : 1995 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of electrical appliances, to Subcommittee CPL/61/01/01, Insect killers, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Attention is drawn to the fact that CEN and CENELEC standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or using the 'Find' facility of the BSI Standards Electronic Catalogue.

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Summary of pages

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Safety of household and similar electrical appliances
Part 2: Particular requirements for insect killers
 (IEC 60335-2-59:1997)

Sécurité des appareils
 électrodomestiques et analogues
 Partie 2: Règles particulières pour les
 destructeurs d'insectes
 (CEI 60335-2-59:1997)

Sicherheit elektrischer Geräte für den
 Hausgebrauch und ähnliche Zwecke
 Teil 2: Besondere Anforderungen für
 Insektenvernichter
 (IEC 60335-2-59:1997)

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European Committee for Electrotechnical Standardization
 Comité Européen de Normalisation Electrotechnique
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Foreword

The text of document 61/1284/FDIS, future second edition of IEC 60335-2-59 prepared by the IEC Technical Committee 61, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60335-2-59 on 1997-10-01.

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-07-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2000-07-01

For products which have complied with EN 60335-2-59:1994 before 2000-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2005-07-01.

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard. Amendments and revisions of part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric 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 of part 1 is to be adapted accordingly.

Subclauses, tables and figures which are additional to those in part 1 are numbered starting with 101.

There are no special national conditions causing a deviation from this European Standard, other than those listed in annex ZA to EN 60335-1.

There are no national deviations from this European Standard, other than those listed in annex ZB to EN 60335-1.

NOTE - 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 2. When a definition of part 1 concerns an adjective, the adjective and the associated noun are also in bold.

Endorsement notice

The text of the International Standard IEC 60335-2-59: 1997 was approved by CENELEC as a European Standard without modification.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

Part 2: Particular requirements for insect killers

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of electric **insect killers** for household and similar purposes, their **rated voltage** being not more than 250 V.

Appliances not intended for normal household use but which nevertheless may 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.

So far as is practicable, this standard deals with the common hazards presented by appliances which are encountered by all persons in and around the home.

This standard does not, in general, take into account

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

NOTE 1 - 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;
- for appliances intended to be used in tropical countries, special 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 2 - This standard does not apply to

- appliances which 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 3 - For appliances provided with discharge or tungsten filament lamps, IEC 60598-1 also applies as far as is reasonable.

2 Definitions

This clause of part 1 is applicable except as follows:

2.2.9 Replacement:

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.

2.101 insect killer: Appliance which electrocutes insects by applying a voltage between two or more grids.

3 General requirement

This clause of part 1 is applicable.

4 General conditions for the tests

This clause of part 1 is applicable except as follows:

4.101 *For each test, the most unfavourable condition specified in 2.2.9 is used.*

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

5 Void

6 Classification

This clause of part 1 is applicable except as follows:

6.1 Modification:

Insect killers shall be of **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 the symbol for high voltage or the substance of the following warning:

Danger – High voltage

The lettering of the warning shall have a height of at least 3 mm and the symbol a height of at least 10 mm.

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

7.6 Addition:



..... high voltage (symbol No. 60417-2-IEC-5036-a)

7.12 Addition:

The instructions for use shall state whether the appliance is for indoor use only or suitable for outdoor use and include 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 on

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

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;
- avoid the improper use of extension cords, keep connections away from moisture and avoid damage to the cord.

8 Protection against access to live parts

This clause of part 1 is applicable except as follows:

8.1.1 Addition:

When the grid voltage is obtained from an isolating transformer, the test finger 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:

11.8 Addition:

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

NOTE – 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.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of part 1 is applicable.

14 Void

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

NOTE – The frequency of the test voltage is higher than **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.

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:

If a drain hole is provided, it shall be at least 5 mm in diameter or 20 mm² in area with a width of at least 3 mm.

22.101 Covers and protective grilles intended to be removed for cleaning purposes, shall be interlocked so that there is no risk of electric shock. Unintentional operation of the interlock shall be prevented.

An interlock switch disconnecting the input circuit shall have a contact separation of at least 3 mm. If the appliance does not incorporate an isolating transformer, the interlock switch shall disconnect all poles.

Compliance is checked by inspection, by measurement and by applying the test finger of figure 1 in an attempt to actuate the interlock when the cover or grille is open.

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. One second after disconnection, the voltage between the grids is measured with an instrument which does not appreciably affect the value to be measured.*

The voltage shall not exceed 34 V.

22.104 The output short-circuit current 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 $(\sqrt{2} U + 750)$ V and is applied for 1 min.

NOTE 1 – U is the peak value of the **working voltage**.

NOTE 2 – 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:

Switches are allowed in flexible cords of appliances for indoor use only.

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 Creepage distances, clearances and distances through insulation

This clause of part 1 is applicable except as follows:

29.1 Addition:

Circuits with voltages greater than 480 V (680 V peak) shall have **creepage distances** and **clearances between live parts and accessible metal parts** not less than those stated in table 101.

Table 101 – Minimum creepage distances and clearances for higher voltages

Working voltage (peak value) V	Creepage distance	Clearance
	mm	mm
>680 and ≤800	5	3,5
>800 and ≤1 000	6	4
>1 000 and ≤1 100	7	4,5
>1 100 and ≤1 250	8	4,5
>1 250 and ≤1 400	9	5,5
>1 400 and ≤1 600	10	7
>1 600 and ≤1 800	11	8
>1 800 and ≤2 000	11,5	9,5
>2 000 and ≤2 200	12	10
>2 200 and ≤2 500	13	11
>2 500 and ≤2 800	14	12
>2 800 and ≤3 200	14,5	13
>3 200 and ≤3 600	15,5	14
>3 600 and ≤4 000	16,5	14,5

For circuits operating at voltages greater than 4 000 V peak, an electric strength test is made to determine the adequacy of **creepage distances** and **clearances**, a voltage of $(\sqrt{2} U + 750)$ V being applied for 1 min. However, **creepage distances** and **clearances** shall not be less than those specified for a **working voltage** of 4 000 V.

No breakdown shall occur during the test.

NOTE – U is the peak value of the **working voltage**.

30 Resistance to heat, fire and tracking

This clause of part 1 is applicable except as follows:

30.2.2 Not applicable.

30.3 *Addition:*

Parts of insulating material enclosing or supporting the grids are not subjected to the test.

NOTE – Parts of insulating material are considered to be subjected to extra-severe duty conditions, unless they are enclosed or located so that pollution is unlikely to occur. In this case, severe duty conditions apply for appliances intended for outdoor use and normal duty conditions apply for appliances for indoor use only.

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 M.

The needle-flame test is not carried out on parts which are made of material classified as FV-0 or FV-1 according to IEC 60707. The sample of material submitted to the test of IEC 60707 shall be no 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 2 is 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 clauses 8 and 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:

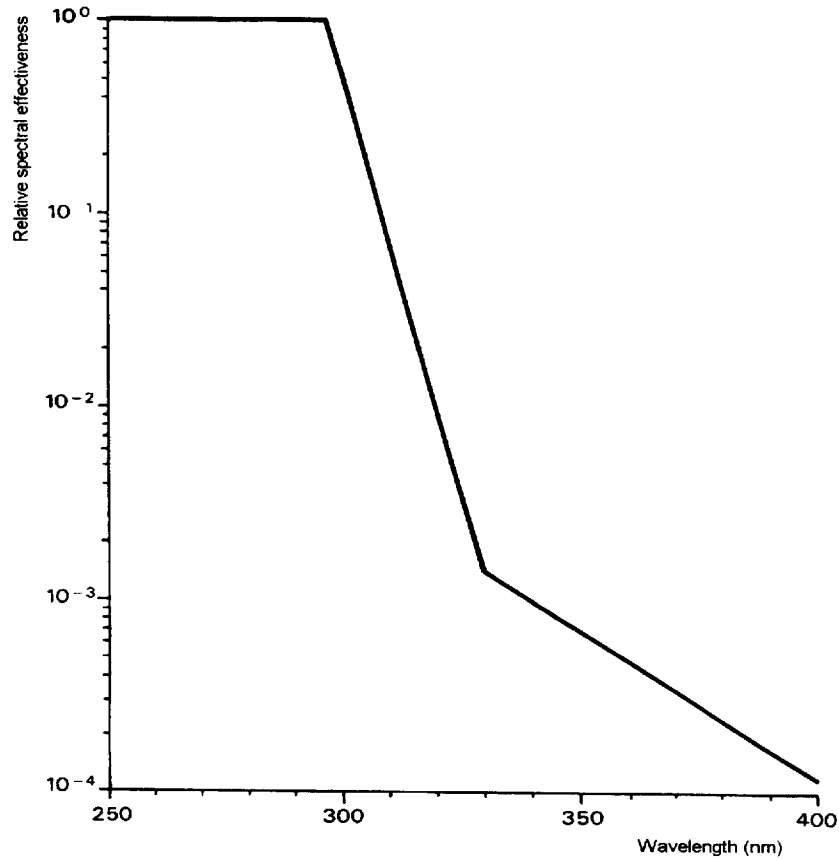
For appliances incorporating lamps emitting UV radiation, compliance is checked by the following test.

*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 – 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.

The effective irradiance for each wavelength is calculated from the UV action curve which is shown in figure 101.

The total effective irradiance is determined and shall not exceed 1 mW/m².



Note 1 - The UV action curve is defined as follows:

Wavelength (λ) nm	Weighting factor
$\lambda < 298$	1
$298 < \lambda \leq 328$	$10^{0.094(298-\lambda)}$
$328 < \lambda \leq 400$	$10^{0.015(140-\lambda)}$

NOTE 2 - Weighting factors for some wavelengths

Wavelength (λ) nm	Weighting factor
250-298	1,0
300	0,65
310	$7,4 \times 10^{-2}$
320	$8,6 \times 10^{-3}$
330	$1,4 \times 10^{-3}$
340	$1,0 \times 10^{-3}$
350	$7,1 \times 10^{-4}$
360	$5,0 \times 10^{-4}$
370	$3,5 \times 10^{-4}$
380	$2,5 \times 10^{-4}$
390	$1,8 \times 10^{-4}$
400	$1,3 \times 10^{-4}$

Figure 101 - UV action curve

Annexes

The annexes of part 1 are applicable except as follows:

Annex A
(normative)

Normative references

International publications with their relevant European publication

Addition:

<u>IEC standard</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
60068-2-52	1996	Environmental testing – Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	1996
60598-1 (mod)	1996	Luminaires – Part 1: General requirements and tests	EN 60598-1	1997

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