

BRITISH STANDARD

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60335-2-45 :
1997
IEC 335-2-45 :
1996**

Specification for

Safety of household and similar electrical appliances

Part 2. Particular requirements

**Section 2.45 Portable heating tools and
similar appliances**

The European Standard EN 60335-2-45 : 1996 has the status of a
British Standard

ICS 25.140.20; 97.180

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee CPL/61, Safety of electrical appliances, to Subcommittee CPL/61/30, Heating appliances (other than room heaters), upon which the following bodies were represented:

- Association of Control Manufacturers (BEAMA Ltd.)
- Association of Manufacturers of Domestic Electrical Appliances
- British Burn Association
- British Electrotechnical Approvals Board
- Consumer Policy Committee of BSI
- Department of Trade and Industry (Consumer Safety Unit, CA Division)
- Electricity Association
- Royal Society for the Prevention of Accidents
- Small Electrical Appliances Marketing Association

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National foreword

This British Standard has been prepared by Subcommittee CPL/61/30 and is the English language version of EN 60335-2-45: 1996, *Safety of household and similar electrical appliances Part 2: Particular requirements for portable heating tools and similar appliances*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 335-2-45 : 1996, published by the International Electrotechnical Commission (IEC).

This British Standard supersedes BS EN 60335-2-45 : 1991 which will be withdrawn on 1 April 1999 in accordance with the CENELEC Internal Regulations. Certification and marks will not be awarded after this date with respect to BS EN 60335-2-45 : 1991. However, such certificates and marks, already awarded, may continue to apply for production until 1 April 2004.

This British Standard is to be read in conjunction with BS EN 60335-1 : 1995 *Specification for safety of household and similar electrical appliances Part 1: General requirements*. The many references to Part 1 should be read as references to BS EN 60335-1, which is the English language version of EN 60335-1 : 1994 which was derived from the second impression, 1993, of IEC publication 335-1 (third edition 1991). 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.

Product approval. Attention is drawn to the fact that products conforming to this British Standard may be approved by the British Electrotechnical Approvals Board for the purposes of participation in the CENELEC Certification Agreement and in the CB Scheme of the IECEE. (Details of the BEAB Approval Scheme are given on the inside back cover.)

Compliance with a British Standard does not of itself confer immunity from legal obligations.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60335-2-45

July 1996

ICS 25.140.20; 97.180

Supersedes EN 60335-2-45 : 1990 and its amendments

Descriptors: Household electrical appliances, soldering irons, portable electric tools, safety requirements, protection against electric shock, fire protection, protection against mechanical hazard

English version

Safety of household and similar electrical appliances
Part 2: Particular requirements for portable heating tools and
similar appliances

(IEC 335-2-45 : 1996)

Sécurité des appareils électrodomestiques et
analogues
Partie 2: Règles particulières pour les outils
chauffants mobiles et appareils analogues
(CEI 335-2-45 : 1996)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2: Besondere Anforderungen für
ortsveränderliche Elektrowärme-werkzeuge und
ähnliche Geräte
(IEC 335-2-45 : 1996)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 61/950/FDIS, future second edition of IEC 335-2-45, prepared by the IEC Technical Committee 61 was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60335-2-45 on 1996-07-02.

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) 1997-04-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 1999-04-01

For products which have complied with EN 60335-2-45 : 1990 and its amendments A1 : 1992 and A51 : 1993 before 1999-04-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2004-04-01.

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 portable electric heating tools and similar appliances*.

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

Subclauses 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.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

Part 2: Particular requirements for portable heating tools and similar appliances

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of **portable electric heating tools** and similar appliances, 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.

Appliances which may be used when mounted on a support are within the scope of this standard.

NOTE 1 – Examples of appliances that are within the scope of this standard are:

- **soldering irons;**
- **desoldering irons;**
- **soldering guns;**
- **conduit soldering tools;**
- **thermoplastic conduit-welding tools;**
- **household film-welding appliances;**
- **plastic-cutting tools;**
- **branding tools;**
- **burning-in pens;**
- **stripping pliers;**
- **glue guns;**
- **dehorning tools;**
- **paint strippers;**
- **fire lighters;**
- **heat guns.**

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.


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NOTES

2 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.

3 This standard does not apply to:

- hand-held motor-operated electric tools (IEC 745);
- transportable motor-operated electric tools (IEC 1029);
- appliances intended exclusively for industrial purposes;
- 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);
- tools for high-frequency heating;
- arc welding equipment.

2 Definitions

This clause of part 1 is applicable except as follows:

2.2.9 Replacement:

normal operation: Operation of appliances under the following conditions:

Appliances having a stand are operated on the stand, unless otherwise specified.

Other appliances are operated in accordance with the instructions for use, unless otherwise specified.

Soldering guns and plastic-cutting tools incorporating a **biased-off switch** are operated in cycles in accordance with the instructions for use but they are switched on for at least 12 s with rest periods not exceeding 48 s. For **soldering guns**, the on-period is such that the temperature at the tip reaches at least 300 °C at the end of the first on-period.

Household film-welding appliances are operated in cycles in accordance with the instructions for use but they are switched on at least for the time necessary to weld together two sheets of plastic film with rest periods not exceeding 2 min. The plastic film is high pressure (low density) polyethylene, each sheet having a thickness of 50 µm.

Heat guns are operated with the hot air flow horizontal.

Fire lighters are operated to ignite charcoal placed in a tray having a diameter of 600 mm and a side 50 mm high. The pile of charcoal is 500 mm in diameter and 100 mm high at its centre.

Contact fire lighters are positioned with the heating element horizontal and inserted in the centre of the charcoal.

Hot-air fire lighters are positioned with the hot air flow horizontal or directed downwards to the maximum angle allowed by the construction, but not more than 45°, whichever is more unfavourable.

2.101 soldering iron: Appliance having a soldering tip which is heated by a heating element.

2.102 desoldering iron: Appliance for melting and removing solder.

2.103 soldering gun: Appliance incorporating a transformer, the soldering tip being part of the secondary circuit.

2.104 conduit-soldering tool: Appliance used for joining metal piping by means of solder.

2.105 household film-welding appliance: Appliance for household use only, used for welding or cutting thin thermoplastic sheets by means of electrically heated parts between which the material is clamped.

2.106 branding tool: Appliance for marking wood, leather and other materials by means of a heated metal stamp.

2.107 burning-in pen: Appliance for scribing on wood, leather and other materials by means of a heated tip.

2.108 dehorning tool: Appliance for burning out horn buds.

2.109 heat gun: Appliance that produces a jet of hot air.

NOTE – Heat guns may be used for fusing materials or for softening paint or plastics.

2.110 paint stripper: Electrically heated appliance for softening paint.

NOTE – Paint strippers may incorporate a scraper.

2.111 fire lighter: Appliance for igniting solid fuel such as charcoal or wood.

2.112 contact fire lighter: Fire lighter incorporating a heating element, which is in direct contact with the fuel.

2.113 hot-air fire lighter: Fire lighter which incorporates a fan and a heating element and which blows hot air at the fuel.

2.114 thermoplastic conduit-welding tool: Appliance for welding conduit by partly melting the thermoplastic material of a separate fitting which has an integral heating wire and is used only once.

2.115 biased-off switch: Switch which automatically returns to the off position when its actuating member is released.



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:

4.2 Addition:

An additional sample of a contact fire lighter is required for the test of 21.102.

5 Void

6 Classification

This clause of part 1 is applicable except as follows:

6.1 Modification:

Dehorning tools shall be of class II or class III.

Other appliances shall be of class I, class II or class III.

6.2 Addition:

Class II dehorning tools and transformers for class III dehorning tools shall be at least IPX4.

Conduit-soldering tools and thermoplastic conduit-welding tools shall be at least IPX4.

Hand-held paint strippers for outdoor use shall be at least IPX4 unless the instructions for use state they are not to be stored outdoors or left outdoors, in which case they may be IPX0.

7 Marking and instructions

This clause of part 1 is applicable except as follows:

7.1 Addition:

Contact fire lighters shall be marked with the limit of insertion into the fuel.

Contact fire lighters which are not at least IPX4 shall be marked with:

Do not expose to rain or moisture.

Thermoplastic conduit-welding tools shall be marked with the types of fittings with which they are to be used and with the corresponding settings. Each fitting shall be marked with the type of appliance with which it is to be used and with its own type reference.

7.12 Addition:

The instructions for use for appliances having a separate stand and not incorporating a **biased-off switch** shall include the substance of the following warning:

WARNING – This tool must be placed on its stand when not in use.

The instructions for use for **class III dehorning tools** shall include the substance of the following warning:

WARNING – Only use the transformer provided.

The instructions for use for **heat guns and hand-held paint strippers** shall include the substance of the following:

- a fire may arise if the appliance is not used with care;
- be careful when using the appliance in places where there are combustible materials. Do not apply to the same place for a long time;
- do not use in presence of an explosive atmosphere;
- heat may be conducted to combustible materials which are out of sight;
- place on its stand after use and allow to cool before storage;
- do not leave the appliance unattended when in use.

The instructions for use for **fire lighters** shall include the substance of the following:

- ensure that the fire lighter is properly positioned;
- unplug before removal from the fire;
- allow to cool before storage;
- do not allow the hot parts of the fire lighter to touch the cord or other flammable materials.

The instructions for use for **thermoplastic conduit-welding tools** shall include the substance of the following:

A welding operation must not be repeated on a fitting since this can result in live parts becoming accessible.

8 Protection against access to live parts

This clause of part 1 is applicable except as follows:

8.1.4 Addition:

Parts operating at **safety extra-low voltage** exceeding 12 V in **thermoplastic conduit-welding tools** are also considered to be **live parts**.



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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:

11.2 Modification:

Appliances are tested away from the walls of the test corner.

11.4 Addition:

Soldering guns and other appliances operated with a transformer are supplied at 1,06 times rated voltage.

11.7 Addition:

Contact fire lighters are operated for 30 min. Hot-air fire lighters are operated for 10 min.

Other appliances are operated until steady conditions are established.

11.8 Modification:

Instead of the temperature rise limit of 400 K specified in table 3 for pure mica and tightly sintered ceramic material, a value of 600 K is allowed.

12 Void**13 Leakage current and electric strength at operating temperature**

This clause of part 1 is applicable except as follows:

13.1 Addition:

Appliances operated with a transformer are tested as motor-operated appliances.

14 Void**15 Moisture resistance**

This clause of part 1 is applicable except as follows:

15.101 Household film-welding appliances provided with a suction device shall be constructed so that suction of liquid does not impair electrical insulation.

NOTE – This requirement does not apply to parts operating at safety extra-low voltage.

Compliance is checked by the following test:

40 ml of water containing approximately 1 % NaCl is poured into a plastic bag. The bag is placed so that the surface of the water is at the same level as the suction opening of the appliance. The bag is then welded with the suction device in operation.

The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on the insulation which could result in a reduction of creepage distances and clearances below the values specified in 29.1.

16 Leakage current and electric strength

This clause of part 1 is applicable except as follows:

16.1 Addition:

Appliances operated with a transformer are tested as motor-operated appliances.

17 Overload protection of transformers and associated circuits

This clause of part 1 is applicable except as follows:

Modification:

The test is not carried out on soldering guns and other appliances in which the heating element is part of the secondary circuit of a transformer.

18 Endurance

This clause of part 1 is not applicable.

19 Abnormal operation

This clause of part 1 is applicable except as follows:

19.1 Addition:

For heat guns and hot-air fire lighters, compliance is also checked by the test of 19.101.



19.2 Replacement:

Appliances are operated under the conditions specified in clause 11 but supplied at 0,94 times rated voltage. However, appliances in which the heating element is part of the secondary circuit of a transformer are operated continuously for 30 min unless they incorporate a biased-off switch, in which case they are operated for 5 min. Fire lighters are operated for 2 h without adding fuel.

Paint strippers incorporating integral scrapers are held horizontally in a clamp over the entire length of the handle. A force of 70 N is exerted on the scraper edge in the direction corresponding to normal use.

19.3 Replacement:

The test of 19.2 is repeated but with the appliance supplied at 1,06 times rated voltage.

19.4 Addition:

Thermoplastic conduit-welding tools are operated with the fastest possible sequence of welding operations.

19.101 Heat guns and hot-air fire lighters are operated as specified in clause 11 until steady conditions are established. The voltage at the terminals of the motor is then reduced until the running speed of the motor is just sufficient to prevent the thermal cut-out from operating, the power input to the heating element being maintained at 1,15 times rated power input.

The voltage is decreased at

- 1 V per minute for motors having a working voltage not exceeding 30 V;**
- 5 V per minute for motors having a working voltage exceeding 30 V.**

The appliances are then operated until steady conditions are established.

The appliances shall not emit flames or molten metal and the temperature rises shall not exceed the values specified in 19.13.

20 Stability and mechanical hazards

This clause of part 1 is applicable except as follows:

20.1 Addition:

Hand-held appliances are subjected to the test while placed on their stands.

20.101 **Contact fire lighters** shall have adequate stability.

Compliance is checked by the following test:

The fire lighter is placed on a horizontal surface so that the maximum insertion mark specified in 7.1 aligns with the edge of the surface. The supply cord is freely suspended, its length including the plug not exceeding 1 m.

The appliance shall not tilt.

21 Mechanical strength

This clause of part 1 is applicable except as follows:

21.1 Addition:

For hand-held appliances, compliance is also checked by the tests of 21.101.

For contact fire lighters, compliance is also checked by the test of 21.102.

21.101 **The supply cord of hand-held appliances** is cut to a length of 100 mm, measured from the point where the cord, or cord guard, enters the appliance.

The appliance is dropped from a height of 1 m on to a hardwood base having a thickness of 50 mm.

This test is made five times, the appliance being in a position such that its major axis is horizontal and so that a different part of the appliance is exposed to the impact each time.

The appliance is then dropped five times with its major axis vertical and with the soldering tip, or corresponding part of other appliances, pointing downwards.

The appliance shall not be damaged to such an extent that compliance with this standard is impaired; in particular live parts shall not have become accessible.

21.102 **The handle of a new contact fire lighter** is held firmly between two lightly padded surfaces with the heating element in a horizontal plane. The fire lighter is supplied at rated voltage. After 3 min a mass of 4,5 kg is suspended at the end of the heating element for 1 min. The mass is removed and the element is allowed to cool. If the element has been bent, it is straightened to its original position.

After the test, the live parts shall not be accessible and the fire lighter shall withstand the electric strength test of 16.3.



22 Construction

This clause of part 1 is applicable except as follows:

22.101 Hand-held appliances intended to be used away from a workshop shall have an integral stand.

NOTE 1 – Examples of appliances intended to be used away from a workshop are:

- **conduit-soldering tools;**
- **branding tools;**
- **dehorning tools;**
- **heat guns;**
- **paint strippers.**

Hand-held appliances intended to be used on a table or similar surface shall have an incorporated stand or be provided with a separate stand.

NOTE 2 – Examples of appliances intended to be used on a table or similar surface are:

- **soldering irons;**
- **desoldering irons;**
- **burning-in pens;**
- **fire lighters.**

These requirements do not apply to appliances if they withstand the test of clause 11 without a stand.

Compliance is checked by inspection and by the test of clause 11.

22.102 Desoldering irons shall incorporate a device for collecting the solder.

Compliance is checked by inspection.

22.103 Soldering guns shall incorporate a **biased-off switch**.

Compliance is checked by inspection.

22.104 If a drain hole is provided in appliances which are likely to suck liquid in normal use, it shall be at least 5 mm in diameter or have an area of 20 mm² with a minimum width of 3 mm.

Compliance is checked by inspection and by measurement.

22.105 Thermoplastic conduit-welding tools shall incorporate a timer which provides **all-pole disconnection** of the welding circuit and has to be reset before further operation.

Repetition of the welding operation on the same fitting shall be prevented.

Compliance is checked by inspection.

NOTE – Repetition of the welding operation is ignored if the appliance has first to be disconnected from the supply mains or from the fitting.

22.106 Thermoplastic conduit-welding tools shall be constructed so that, when they are operated without fittings, the voltage at the connecting terminals is **extra-low voltage** and does not exceed 24 V.

Compliance is checked by measurement.

22.107 Fittings for thermoplastic conduit-welding tools shall be constructed so that at least **basic insulation** is provided on surfaces which are only accessible before the fitting is placed on the conduit.

Compliance is checked by inspection.

22.108 Class III dehorning tools shall be supplied with a transformer.

Compliance is checked by inspection.

23 Internal wiring

This clause of part 1 is applicable.

24 Components

This clause of part 1 is applicable except as follows:

24.1.3 Addition:

Switches incorporated in the hand-held part of appliances not intended exclusively for household use are tested for 50 000 cycles of operation.

25 Supply connection and external flexible cords

This clause of part 1 is applicable except as follows:

25.5 Addition:

Type Z attachment is allowed for:

- **class III appliances;**
- other appliances, unless they are provided with a polyvinyl chloride sheathed cord and the temperature rise of external metal parts exceeds 75 K.

25.7 Addition:

Light polyvinyl chloride sheathed cords may be used for **class III appliances** and other **hand-held appliances**, regardless of the mass of the appliance.



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Polyvinyl chloride sheathed cords may be used for **hand-held appliances** having a **rated power input** not exceeding 100 W and a mass not exceeding 100 g, and for appliances provided with a **biased-off switch**, regardless of the temperature rise of external metal parts.

NOTE – The mass is determined without the supply cord.

Polyvinyl sheathed cords are not allowed for **thermoplastic conduit-welding tools** and **fire lighters**.

The **supply cord** of **class II dehorning tools** shall be polychloroprene sheathed and be not lighter than heavy polychloroprene sheathed cord (code designation 245 IEC 66).

25.8 Addition:

The length of the **supply cord** shall be at least:

- 1,5 m for **fire lighters**;
- 6 m for **class II dehorning tools**.

25.15 Modification:

Instead of the first line in table 10, the following applies for hand-held appliances:

<i>Mass of the appliance kg</i>	<i>Pull force N</i>	<i>Torque Nm</i>
<i>≤ 0,3</i>	<i>15</i>	<i>0,05</i>
<i>> 0,3 and ≤ 1</i>	<i>30</i>	<i>0,1</i>

25.23 Addition:

The length of the **interconnection cord** of **class III dehorning tools** shall be at least 4 m.

26 Terminals for external conductors

This clause of part 1 is applicable.

27 Provision for earthing

This clause of part 1 is applicable except as follows:

27.2 Addition:

NOTE – **Class II soldering irons** and **class II soldering guns** used for soldering electronic equipment may have an equipotential bonding terminal for which the dimensional requirements are not 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:

29.2.1 Addition:

Mica in thin sheet form may be used

- for **supplementary insulation**, if there are at least six layers, provided that any three layers together withstand the electric strength test of 16.3 for **supplementary insulation**;
- for **reinforced insulation**, if there are at least ten layers, provided that any five layers together withstand the electric strength test of 16.3 for **reinforced insulation**.

30 Resistance to heat, fire and tracking

This clause of part 1 is applicable except as follows:

30.2 Addition:

For contact fire lighters, 30.2.3 applies. For other appliances, 30.2.2 applies.

31 Resistance to rusting

This clause of part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of part 1 is applicable.



Annexes

The annexes of part 1 are applicable.

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