

Household and similar electrical appliances — Safety —

**Part 2-49: Particular requirements for
commercial electric appliances for
keeping food and crockery warm**

ICS 97.030

National foreword

This British Standard is the UK implementation of EN 60335-2-49:2003+A11:2012, incorporating corrigendum September 2007. It is derived from IEC 60335-2-49:2002, incorporating amendment 1:2008. It supersedes BS EN 60335-2-49:2003+A1:2008 which will be withdrawn on 21 December 2014.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** ~~A1~~.

Where a common modification has been introduced by amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A11:2012 are indicated by **C11** ~~C11~~.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/5, Commercial catering equipment.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
17481 Corrigendum No. 1	31 January 2008	Last paragraph of EN foreword replaced. Addition to Annex ZB deleted
	31 July 2009	Implementation of IEC amendment 1:2008 with CENELEC endorsement A1:2008
	31 May 2012	Implementation of CENELEC amendment A11:2012

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EUROPEAN STANDARD

EN 60335-2-49:2003+A11

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Incorporating corrigendum September 2007

English version

**Household and similar electrical appliances –
Safety
Part 2-49: Particular requirements for commercial electric appliances
for keeping food and crockery warm
(IEC 60335-2-49:2002)**

Appareils électrodomestiques
et analogues –
Sécurité
Partie 2-49: Règles particulières
pour les armoires chauffantes électriques
à usage collectif
(CEI 60335-2-49:2002)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2-49: Besondere Anforderungen
für elektrische Wärmeschränke
für den gewerblichen Gebrauch
(IEC 60335-2-49:2002)

This European Standard was approved by CENELEC on 2003-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

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Foreword

The text of document 61E/404/FDIS, future fourth edition of IEC 60335-2-49, prepared by SC 61E of the IEC Technical Committee 61, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60335-2-49 on 2003-02-01.

This European Standard replaces EN 60335-2-49:2000.

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) 2003-11-01
- date on which national standards
conflicting with the EN have to be withdrawn (dow) 2006-02-01

This part 2 has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements. It was established on the basis of the 2002 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 commercial electric hot cupboards.

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.

NOTE 1 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.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 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.

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.

Introduction

C11 The principle objectives of Low Voltage Directive, 2006/95/EC, are covered in this standard. The essential safety requirements of the Machinery Directive 2006/42/EC have also been taken into account for appliances covered by this part. **C11**

Endorsement notice

The text of the International Standard IEC 60335-2-49:2002 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 61E/617/FDIS, future amendment 1 to IEC 60335-2-49:2002, prepared by SC 61E, Safety of electrical commercial catering equipment, of IEC Technical Committee 61, Safety of household and similar electrical appliances, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60335-2-49:2003 on 2008-07-01.

The following dates are applicable:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2009-04-01
- date on which national standards conflicting with the amendment have to be withdrawn (dow) 2011-07-01

This amendment supplements or modifies the corresponding clauses of EN 60335-2-49:2003.

There are no special national conditions causing a deviation from this amendment.

There are no national deviations from this amendment.

Endorsement notice

The text of amendment 1:2008 to the International Standard IEC 60335-2-49:2002 was approved by CENELEC as an amendment to the European Standard without any modification.

In the Bibliography, add the following note to the standard mentioned:

ISO 13732-1 NOTE Harmonized as EN ISO 13732-1:2006 (not modified).

Foreword to amendment A11

This document (EN 60335-2-49:2003/A11:2012) has been prepared by CLC/TC 61, "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which the amendment has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2012-12-21
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2014-12-21



This amendment supplements or modifies the corresponding clauses of EN 60335-1:2012, EN 60335-2-49:2003 and EN 60335-2-49:2003/A1:2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

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INTRODUCTION

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

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

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

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

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

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

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

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

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

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

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-49: Particular requirements for commercial electric appliances for keeping food and crockery warm

1 Scope

This clause of Part 1 is replaced by the following:

This International Standard deals with the safety of electrically operated commercial **A1** appliances for keeping food and crockery warm **A1** not intended for household use, their **rated voltage** being not more than 250 V for single-phase appliances connected between one phase and neutral, and 480 V for other appliances.

A1 Examples of appliances that are within the scope of this standard are:

- **hot cupboards**, with or without **heated tops**;
- **heated tops**;
- **heated display cases**;
- **heated crockery dispensers**;
- **heated tables**;
- **radiant heaters**. **A1**

C11 Additional requirements for appliances with power driven moving parts are given in Annex ZE. **C11**

NOTE 101 These appliances are used, for example in restaurants, canteens, hospitals and similar commercial enterprises.

The electrical part of appliances making use of other forms of energy is also within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by these types of appliances.

NOTE 102 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities;
- for appliances intended to be used outdoors, additional requirements may be necessary.

NOTE 103 **C11** This standard does not apply to

- machines designed exclusively for industrial purposes,
- machines intended to be used in locations where a corrosive or an explosive atmosphere is present (dust, vapour or gas),
- continuous process machines for the mass production of food,
- machinery for processing cosmetics, chemicals and pharmaceutical products,
- bains-maries (IEC 60335-2-50). **C11**

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60436, *Methods for measuring the performance of electric dishwashers*

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.4 *Addition:*

NOTE 101 The **rated power input** is the sum of the power inputs of all the individual elements in the appliance that can be on at one time; where there are several such combinations possible, that giving the highest power input is used in determining the **rated power input**.

3.1.9 *Replacement:*

normal operation

operation of the appliance under the following conditions

Appliances are operated empty and with any controls intended to be operated by the user set at the maximum.

If the appliance cannot be operated empty, then the manufacturer's instructions are taken into account.

Doors, covers or lids, if any, are placed in their intended positions.

Motors incorporated in the appliance are operated in the intended manner under the most severe conditions that can be expected in normal use taking into account the manufacturer's instructions.

A1 Appliances incorporating **induction heating sources** are operated with the **induction crockery** placed on **induction trays**. All tray supports are loaded, but partial up to full load shall be possible.

All controls are set to maximum, and the **induction crockery** is half-filled with initially cold water. Covers (cloches) are in their position.

The appliances consist of several units, which can form up to three separated modules; they are connected together during operation. These units are the heating module with the **induction heating source**, the rack with the **coil carriers** and the enclosure with the supports for the **induction trays** including the **induction crockery**. **A1**

3.101

hot cupboard

an appliance that is used for maintaining the temperature of hot food and for the warming of crockery

3.102

heated top

the top surface of a **hot cupboard**, that is designed to maintain the required temperature. It may be heated indirectly by the **hot cupboard** heating elements or directly by separate heating elements

3.103

heated display case

a **hot cupboard** in which food is displayed, the heated food being served from the display

3.104

heated crockery dispenser

an appliance designed specifically for the storage, warming and dispensing of plates, etc.

**3.105
installation wall**

C11 fixed construction containing supply facilities for wall mounted appliances on one or both sides **C11**

**A1 3.106
heated table**

appliance designed for warm-holding on the surface

**3.107
radiant heater**

stationary appliance for keeping food and crockery warm by means of radiant heat

NOTE A part of the appliance can be swivelling.

**3.108
heating unit**

any part of an appliance that fulfils an independent cooking or heating function

**3.109
induction heating source**

heating source that operates by inducing eddy currents in **induction crockery**

**3.110
coil carrier**

insulation device containing the induction winding

**3.111
induction crockery**

crockery suitable to be heated by induction for heating up or keeping food warm

**3.112
induction tray**

tray adapted to **induction crockery**, as recommended by the manufacturer **A1**

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.

C11 5.5 Addition

Appliances are operated empty and with any controls intended to be operated by the user set at the maximum.

If the appliance cannot be operated empty, then the manufacturer's instructions are taken into account.

Doors, covers or lids, if any, are placed in their intended positions.

Motors incorporated in the appliance are operated in the intended manner under the most severe conditions that can be expected in normal use taking into account the manufacturer's instructions.

*Appliances incorporating **induction heating sources** are operated with the **induction crockery** placed on **induction trays**. All tray supports are loaded, but partial up to full load shall be possible.*

*All controls are set to maximum, and the **induction crockery** is half-filled with initially cold water. Covers (cloches) are in their position.*

*The appliances consist of several units, which can form up to three separated modules; they are connected together during operation. These units are the heating module with the **induction heating source**, the rack with the **coil carriers** and the enclosure with the supports for the **induction trays** including the **induction crockery**. **C11***

5.10 Addition:

*Appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall** are enclosed to obtain protection against electric shock and harmful ingress of water equivalent to that obtained when installed in accordance with the instructions provided with the appliance.*

NOTE 101 Appropriate enclosures or additional appliances may be needed for test purposes.

5.101 Appliances are tested as **heating appliances**, even if they incorporate a motor.

5.102 Appliances, when assembled in combination with or incorporating other appliances, are tested in accordance with the requirements of this standard. The other appliances are operated simultaneously in accordance with the requirements of the relevant standards.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

Appliances shall be **class I** with respect to protection against electric shock.

Compliance is checked by inspection and by the relevant tests.

A1 6.2 Addition:

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4. **A1**

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

In addition, appliances shall be marked with the water pressure or range of pressures, in kilopascals (kPa), for appliances intended to be connected to a water supply, unless this is indicated in the instructions.

A1 Appliances incorporating **induction heating sources** shall also be marked with:

- the operating frequency or operating frequency range, in kilohertz (kHz);
- the total power input of all the induction **heating units** that can operate simultaneously, in watts (W) or kilowatts (kW), unless this is indicated in the instructions;
- the total power input of all the non-induction **heating units** that can operate simultaneously, in watts (W) or kilowatts (kW), unless this is indicated in the instructions.

NOTE 101 The power input to be marked or declared is the highest power input that any switch arrangement will allow.

Any cover giving access to **live parts** at a **working voltage** exceeding 250 V shall be marked with symbol IEC 60417-5036 (2002-10), or with the following warning:

WARNING – DANGEROUS VOLTAGE



Covers giving access to induction coils shall be marked with symbol IEC 60417-5140 (2003-04), or with the following warning:

CAUTION – MAGNETIC FIELD

NOTE 102 If it is not possible to mark these warnings on the cover, they may be placed close to the cover-retaining screws. **A1**

7.6 Addition:


 [symbol IEC 60417-5041 (2002-10)] caution, hot surface

 [symbol IEC 60417-5140 (2003-04)] non-ionizing electromagnetic radiation 

7.12 Addition:

 If symbols IEC60417-5021, ISO7000-0434 and ISO7000-0790 are used on the product or in the instructions, their meaning shall be explained. 


The instructions of appliances provided with wheels or similar means shall also state the maximum load, in kilograms (kg), of the appliance.

 The front cover of the instructions shall include the substance of the following:

CAUTION: Read the instructions before using the machine.


This wording may be replaced by symbols ISO 7000-0434 and ISO 7000-0790.

The instructions shall also state the maximum weight of the empty appliance. 

 The instructions for appliances incorporating **induction heating sources** shall include the substance of the following warning and information:


- WARNING: If the surface of coil carriers changes to darker colour or shows cracks, immediately disconnect the appliance from the supply.
- metallic objects such as kitchen utensils, cutlery, etc., shall not be placed on the induction tray within zones provided for the induction crockery since they could get hot;
- only use induction crockery and induction trays recommended by the manufacturer;
- users with heart pacemakers should consult with the manufacturer (unless specific details are given).


Modification:

The instruction concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge is not applicable. 

7.12.1 Replacement:

The appliance shall be accompanied by instructions detailing any special precautions necessary for installation. For appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall**, details of how to ensure appropriate protection against electric shock and harmful ingress of water shall be supplied. If the controls of more than one appliance are combined in a separate enclosure, detailed installation instructions shall be supplied. Instructions for **user maintenance**, for example cleaning, shall also be given. They shall include a statement that the appliance is not to be cleaned with a water jet.

 For appliances incorporating swivelling **radiant heaters**, the installation instructions shall include detailed information concerning the area of swivelling with regard to the surrounding conditions. Information shall be given on how to limit the swivelling area by the installer.

The operation of appliances incorporating **induction heating sources** requires an increased instruction of the personnel. In addition, the instructions shall state that any repairs shall be carried out only by persons trained or recommended by the manufacturer. 

C11 For appliances that are permanently connected to fixed wiring and for which leakage currents may exceed 10 mA, particularly if disconnected or not used for long periods, or during the initial installation, the instructions shall give recommendations regarding the rating and type of the additional **protective devices**, such as residual-current device(s), to be installed. **C11**

Compliance is checked by inspection.

7.12.4 Addition:

The instructions for **built-in appliances** having a separate control panel for several appliances shall state that the control panel is only to be connected to the specified appliances in order to avoid a possible hazard.

7.15 Addition:

When it is not practical to place the marking of **fixed appliances** so that it is visible after the appliance has been installed, the relevant information shall also be included in the instructions for use or on an additional label that can be fixed near the appliance after installation.

NOTE 101 An example of such a **fixed appliance** is a **built-in appliance**.

A1 For appliances incorporating **induction heating sources** in modular design, the additional label shall be fixed to the heating module (generator). **A1**

7.101 Equipotential bonding terminals shall be marked with symbol 5021 of IEC 60417-1.

These markings shall not be placed on screws, removable washers or other parts that can be removed when conductors are being connected.

Compliance is checked by inspection.

A1**7.102** If a swivel **radiant heater** can be swung over adjacent areas or appliances, the instructions for use and installation shall indicate this range. If the temperature rise of the top of the adjacent area or appliance exceeds 65 K during the tests of Clause 11, or 125 K during the tests of Clause 19, the installation instructions provided by the manufacturer shall include the substance of the following warning, which shall also be included on a non-permanent label attached to the appliance:

WARNING: If this radiant heater is positioned adjacent to other areas or appliances, it is recommended that, within the range of the radiation, these areas or appliances be made of non-combustible material, otherwise, they shall be clad with a non-combustible heat-insulating material, and attention is to be paid to fire prevention regulations.

Compliance is checked by inspection.

7.103 Food warming areas of **radiant heaters** adjacent to the appliance shall be permanently marked if the temperature rise during Clause 11 exceeds 65 K. This marking is not required if the swivelling area is between a bank of other appliances.

Compliance is checked by inspection. **A1**

A1) 7.104 The side of the **radiant heater** case facing the user (front side) shall be permanently marked with symbol IEC 60417-5041 (2002-10).

Compliance is checked by inspection.

7.105 The zones on **induction trays** where the **induction crockery** is to be placed shall be marked permanently, e.g. by an appropriate design.

Compliance is checked by inspection. A1

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor-operated appliances

This clause of Part 1 is applicable except as follows.

9.101 Fan motors providing a cooling effect in order to comply with the requirements of Clause 11 shall start under all voltage conditions that may occur in use.

*Compliance is checked by starting the motor three times at a voltage equal to 0,85 times **rated voltage**, the motor being at room temperature at the beginning of the test.*

*The motor is started each time under the conditions occurring at the beginning of **normal operation** or, for automatic appliances, at the beginning of the normal cycle of operation, the motor being allowed to come to rest between successive starts. For appliances provided with motors having other than centrifugal starting switches, this test is repeated at a voltage equal to 1,06 times **rated voltage**.*

*In all cases, the motor shall start and it shall function in such a way that safety is not affected, and the overload **protective devices** of the motor shall not operate.*

NOTE The supply source is such that, during the test, the drop in voltage does not exceed 1 %.

10 Power input and current

This clause of Part 1 is applicable except as follows.

A1) 10.1 *Modification:*

Instead of the first paragraph of the requirement, the following applies:

The power input of appliances without **induction heating sources**, at **rated voltage** and at normal operating temperature, shall not deviate from the **rated power input** by more than the deviation shown in Table 1.

The power input of appliances having only **induction heating sources**, at **rated voltage** and at normal operating temperature, shall not deviate from the **rated power input** by more than 10 %. A1

A1 *The measurement is made before the controls are adjusted to the reduced setting.*

*For appliances incorporating induction and non-induction **heating sources**, the following applies:*

*The power input of the **induction heating sources** and the non-induction **heating sources** is measured separately, in each case using a combination of **heating units** that can be on at the same time to give the highest power input. For the **induction heating sources**, the measurement is made before the controls are adjusted to the reduced setting.*

For **induction heating sources**, the power input so measured shall not deviate from the power input marked or declared by the manufacturer (see 7.1) by more than 10 %. For non-induction **heating sources**, the power input so measured shall not deviate from the power input marked or declared by the manufacturer (see 7.1) by more than the deviation shown in Table 1 for **heating appliances**.

In addition, the power input of the appliance when the **induction** and non-induction **heating sources** are operated simultaneously shall not deviate from the **rated power input** by more than 10 %.

Addition:

NOTE 101 For appliances having more than one **heating unit**, the total power input may be determined by measuring the power input of each **heating unit** separately (see also 3.1.4). **A1**

11 Heating

This clause of Part 1 is applicable except as follows.

A1 **11.1 Addition:**

*For **radiant heaters**, 11.101 applies. **A1***

11.2 Addition:

Appliances intended to be fixed to the floor and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means are installed in accordance with the manufacturer's instructions. If no instructions are given, these appliances are considered as appliances normally placed on the floor.

A1 **11.3 Addition:**

NOTE 101 If the measurements can be unduly influenced by emissions from an **induction heating source**, i.e. the magnetic field, this must be taken into account.

In general, the use of thermocouples is not recommended because of the expected faulty heating-up of the thermocouples caused by the **induction heating source**. For example, the temperature rise of the **induction heating source** can be determined by using a platinum resistance, preferably of high resistance, with twisted connecting wires. The platinum resistances are placed on the hottest point of the winding so as to influence as little as possible the temperature to be measured. **A1**

11.4 Replacement:

A1 *The non-induction **heating units** of the appliance are operated under **normal operation** at 1,15 times the power input marked or declared. **A1***

A1) *Induction heating units* are operated simultaneously and supplied separately at the most unfavourable voltage between 0,94 times minimum **rated voltage** and 1,06 times maximum **rated voltage**.

If it is not possible to switch on all heating elements or **induction heating sources** at the same time, the test is made with each of the combinations that the switch arrangement will allow, the highest load possible with each switching arrangement being in circuit. **A1)**

If the appliance is provided with a control that limits the total power input, the test is made with whichever combination of heating units as may be selected by the control imposes the most severe condition.

If the temperature rise limits of motors, transformers or **electronic circuits** are exceeded, the test is repeated with the appliance supplied at 1,06 times **rated voltage**. In this case only the temperature rises of motors, transformers or **electronic circuits** are measured.

11.7 Replacement:

A1) Appliances incorporating **induction heating sources** are operated at maximum setting of the controls for one cycle, which consists of a heating-up phase and a keeping warm phase.

Appliances without **induction heating sources** are operated until steady conditions are established.

NOTE 101 The duration of the test on non-induction appliances may consist of more than one cycle of operation.

11.8 Addition:

NOTE 101 The crockery itself is regarded as functional surface.

11.101 For **radiant heaters**, the temperature rise limit of 65 K applies to the areas, including walls, which are reached by the radiation. If this temperature rise limit is exceeded, the requirements of 7.102 apply. **A1)**

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 Modification:

Instead of the permissible leakage current for **stationary class I appliances**, the following applies:

- for cord and plug connected appliances 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA
- for other appliances 1 mA per kW **rated power input** of the appliance with no maximum

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.1.1 Addition:

In addition, IPX0, IPX1, IPX2, IPX3 and IPX4 appliances are subjected for 5 min to the following splash test.

The apparatus shown in Figure 101 is used. During the test, the water pressure is so regulated that the water splashes up 150 mm above the bottom of the bowl. The bowl is placed on the floor for appliances normally used on the floor. For all other appliances, on a horizontal support 50 mm below the lowest edge of the appliance, the bowl is so moved around as to splash the appliance from all directions. Care is taken that the appliance is not hit by the direct jet.

15.1.2 Modification:

Appliances normally used on a table are placed on a support having dimensions that are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the support.

15.2 Replacement:

Appliances shall be constructed so that spillage of liquid in normal use does not affect their electrical insulation.

Compliance is checked by the following test:

*Appliances with **type X attachment**, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cable or cord of the smallest cross-sectional area specified in 26.6 and other appliances are tested as delivered.*

Appliances provided with an appliance inlet are tested with or without an appropriate connector in position, whichever is the more unfavourable.

Detachable parts are removed.

A litre of cold water containing approximately 1 % NaCl is poured steadily over a period of 1 min on to the centre of any heated surface.

NOTE 101 **Crockery dispensers** are not tested.

*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 that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

15.3 Addition:

NOTE 101 If it is not possible to place the whole appliance in the humidity cabinet, parts containing electrical components are tested separately, taking into account the conditions that occur in the appliance.

15.101 Appliances that are provided with a tap intended for filling or cleaning shall be constructed so that the water from the tap cannot come into contact with **live parts**.

Compliance is checked by the following test.

The tap is fully opened for 1 min with the appliance connected to a water supply having the maximum water pressure indicated by the manufacturer. Tiltable and movable parts, including lids, are tilted or placed in the most unfavourable positions. Swivelling outlets of water taps are so positioned as to direct water on to those parts that will give the most unfavourable result. Immediately following this treatment the appliance shall withstand an electric strength test as specified in 16.3.

16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

16.2 Modification:

Instead of the permissible leakage current for **stationary class I appliances**, the following applies:

- for cord and plug connected appliances 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA
- for other appliances 1 mA per kW **rated power input** of the appliance with no maximum

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 Addition:

A control or switching device that is intended for different settings corresponding to different functions of the same part of the appliance and that are covered by different standards is, in addition, set in the most severe setting irrespective of the manufacturer's instructions.

A1 Appliances incorporating **induction heating sources** are also subjected to the tests of 19.101 and 19.102.

For **radiant heaters**, 19.103 applies. **A1**

19.2 Addition:

Fan motors are rendered inoperative.

Doors or lids are open or closed, whichever is the more unfavourable.

Surfaces incorporating heating elements and **heated tops** heated indirectly by the **hot cupboard** heating elements are covered with a layer of felt having a mass of $4 \text{ kg/m}^2 \pm 0,4 \text{ kg/m}^2$ and a thickness of 25 mm.

NOTE 101 Surfaces heated by a radiation source not incorporated in the surface are not covered.

*Detachable reflectors and similar **detachable parts** are placed in any position or removed, whichever is the more unfavourable.*

A1 Appliances incorporating **induction heating sources** are operated fully loaded, with empty **induction crockery** without covers (cloches) in their position, until steady conditions are established.

19.3 Addition:

Induction heating sources are supplied with a voltage of 1,06 times the **rated voltage**. **A1**

19.4 Addition:

NOTE 101 The main contacts of the contactor intended for switching on and off the heating element(s) in normal use are locked in the "ON" position. However, if two contactors operate independently of each other or if one contactor operates two independent sets of main contacts, these contacts are locked in the "ON" position in turn.

19.8 Addition:

Compliance is checked as for 19.7.

A1 19.13 Modification:

*For appliances incorporating **induction heating sources** having **working voltages** above 250 V, the following test voltages apply:*

- 1 000 V is increased to $1,2 \times U + 700 \text{ V}$;
- 2 750 V is increased to $1,2 \times U + 2 450 \text{ V}$;
- 3 750 V is increased to $2,4 \times U + 3 150 \text{ V}$.

*where U is the **working voltage**.*

Addition:

The temperature of the induction windings shall not exceed the values specified in Table 8.

19.101 Appliances incorporating **induction heating sources** shall be constructed so that the risk of fire, mechanical hazard or electric shock is obviated as far as is practicable in the event of incorrect operation or the development of defects in control devices or circuit components.

*Compliance is checked by applying any form of operation or any defect in the relevant circuits which may be expected in normal use while the appliance is operated under **normal operation at rated voltage** or at the upper limit of the **rated voltage range**. Only one fault condition is reproduced at a time, the test being made consecutively. **A1***

A1 NOTE Examples for fault conditions are:

- drop-out of contactors and of electromagnetic components;
- failure of motors to start;
- drop in voltage supply, re-appearance of the voltage, voltage interruptions of up to 0,5 s;
- fault conditions specified in 19.11, as applicable.

Examination of the appliance and its circuit diagrams will generally show the fault conditions to be simulated.

19.102 Appliances incorporating **induction heating sources** shall be constructed so that a small piece of metal being situated on a **coil carrier** shall not cause the temperature of the windings of this **coil carrier** to exceed the relevant values specified in Table 8, or shall not lead to a damage of the insulation of this **coil carrier**.

*Compliance is checked by placing a piece of flat mild steel, 2 mm thick and having dimensions 100 mm x 20 mm, in the most unfavourable situation on a **coil carrier**. The appliance is supplied at **rated voltage**, all controls are set to their maximum.*

19.103 For **radiant heaters**, the limit of 125 K temperature rise applies to the areas, including walls, which are reached by the radiation. If this temperature rise limit is exceeded, the requirements of 7.102 apply. **A1**

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 Addition:

Appliances provided with doors, covers or lids, racks and other accessories are tested with doors open or closed, racks partially or fully extended, with or without covers or lids or other accessories, whichever is the more unfavourable.

Appliances provided with wheels or similar means are also subjected to the following test.

Crockery dispensers are loaded with dishes so that the load obtained is equal to one-third of the load declared by the manufacturer. The load is placed on the highest usable parts of the appliance. The dishes used are as specified in IEC 60436. If special dishes are specified by the manufacturer, these are used.

Other appliances are loaded with one-third of the load declared by the manufacturer, placed on the highest usable parts of the appliance.

Appliances provided with doors, covers or lids and other accessories are tested with doors open or closed, with or without covers or lids or other accessories, whichever is the more unfavourable.

The appliance is then placed in the most unfavourable position against an edge with a height equal to the radius of the wheels plus 10 mm. If the wheels differ in size, that edge height that is the most unfavourable is chosen.

A force equal to 8 % of the mass of the fully loaded appliance is applied horizontally to the middle of the top edge of the appliance but not higher than 900 mm, in the most unfavourable direction.

The appliance shall not tilt.

20.2 Addition:

Moving parts of motor and fan assemblies of appliances where the fan motor can be operated when the door is open shall be arranged or enclosed so that adequate protection against injury is provided during normal use including cleaning.

It shall not be possible to touch the moving parts of the fan.

Compliance is checked by test probe 41 of IEC 61032 applied with a force of 10 N.

20.101 Guards fitted over motor and fan assemblies in order to comply with the requirements of 20.2 shall not be **detachable parts** unless

- a suitable interlock assembly is fitted that prevents the motor or fan from operating when the guard is removed;
- the guard forms an integral part of the internal lining.

Compliance is checked by inspection and by manual test.

21 Mechanical strength

A1 This clause of Part 1 is applicable except as follows.

21.1 Addition:

*The impact test is also applied to the **coil carriers**.* **A1**

22 Construction

This clause of Part 1 is applicable except as follows.

22.15 Addition:

Appliances intended to transport food or other loads shall be provided with a suitable means to protect the **supply cord** from damage during transportation.

A1 **22.101** For three-phase appliances, **thermal cut-outs** protecting circuits with heating elements, and those for motors of which the unexpected starting may cause a hazard, shall be of the non-self-resetting and trip-free type, and shall provide **all-pole disconnection** from related supply circuits.

For single-phase appliances and for single-phase heating elements and/or motors connected between one phase and neutral or between phase and phase, **thermal cut-outs** protecting circuits with heating elements, and those for motors of which the unexpected starting may cause a hazard, shall be of the non-self-resetting and trip-free type, and shall provide at least one-pole disconnection. **A1**

A1 If the **non-self-resetting thermal cut-out** is only accessible after removing parts with the aid of a **tool**, the trip-free type is not required.

NOTE 1 **Thermal cut-outs** of the trip-free type have an automatic action, with a reset actuating member, so constructed that the automatic action is independent of manipulation or position of the reset mechanism.

Thermal cut-outs of the bulb and capillary type that operate during the tests of Clause 19 shall be such that rupture of the capillary tube shall not impair compliance with the requirements of 19.13.

Compliance is checked by inspection, by manual test and by rupturing the capillary tube.

NOTE 2 Care must be taken to ensure that the rupture does not seal the capillary tube. **A1**

22.102 Lights, switches or push-buttons shall only be coloured red for the indication of danger, alarm or similar situations.

Compliance is checked by inspection.

22.103 Appliances fitted with wheels or similar means shall be provided with an efficient means of locking while the appliance is stationary.

Compliance is checked by inspection and by the following test.

A1 *The appliance, fully loaded in accordance with the manufacturer's instructions, is placed on a rigid plane coated with aluminium oxide paper (grain size 80) and inclined at 10° to the horizontal, with the locking mechanism applied. The appliance shall not move by more than 100 mm. **A1***

22.104 Portable appliances shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 6 mm. However, if the appliance is fitted with legs, this distance is increased to 10 mm if the appliance is intended to stand on the table and to 20 mm if it is intended to stand on the floor.*

A1 **22.105 Induction heating sources** shall have adequate visual or audible warning that the control is in the "ON" position.

Compliance is checked by inspection.

NOTE The position of a control knob does not, in itself, constitute an adequate warning. **A1**

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.3 Addition:

When the capillary tube of the **thermostat** is liable to flexing in normal use, the following applies:

- where the capillary tube is fitted as part of the internal wiring, Part 1 applies;
- where the capillary tube is separate, it shall be subjected to 1 000 flexings at a rate not exceeding 30 per minute.

NOTE 101 If, in any of the above cases, it is not possible to move the movable part of the appliance at the given rate, due for example to the mass of the part, the rate of flexing may be reduced.

After the test, the capillary tube shall show no sign of damage within the meaning of this standard and no damage impairing its further use.

However, if a rupture of the capillary tube renders the appliance inoperative (fail-safe), separate capillary tubes are not tested, and those fitted as part of the internal wiring are not inspected for compliance with the requirements.

Compliance in this instance is checked by rupturing the capillary tube.

NOTE 102 Care must be taken to ensure that the rupture does not seal the capillary tube.

24 Components

This clause of Part 1 is applicable except as follows.

24.101 Connectors fitted to appliances shall not incorporate a **thermostat**.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.3 *Addition:*

Fixed appliances and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means shall be constructed so that the **supply cord** can be connected after the appliance has been installed in accordance with the manufacturer's instructions.

Terminals for permanent connection of cables to fixed wiring may also be suitable for the **type X attachment** of a **supply cord**. In this case a cord anchorage complying with 25.16 shall be fitted to the appliance.

If the appliance is provided with a set of terminals allowing the connection of a flexible cord, they shall be suitable for the **type X attachment** of the cord.

In both cases the instructions shall give full particulars of the power **supply cord**.

The connection to the supply wires of **built-in appliances** may be made before the appliance is installed.

Compliance is checked by inspection.

25.7 *Modification:*

Instead of the types of **supply cords** specified, the following applies.

Supply cords shall be oil-resistant, sheathed flexible cable not lighter than ordinary polychloroprene or other equivalent synthetic elastomer-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 except as follows.

27.2 *Addition:*

Stationary appliances shall be provided with a terminal for the connection of an external equipotential conductor. This terminal shall be in effective electrical contact with all fixed exposed metal parts of the appliance, and shall allow the connection of a conductor having a nominal cross-sectional area of up to 10 mm². It shall be located in a position convenient for the connection of the bonding conductor after installation of the appliance.

NOTE 101 Small fixed exposed metal parts, for example nameplates and the like, are not required to be in electrical contact with the terminal.

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 and the insulation shall have a comparative tracking index (CTI) not less than 250, 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 and fire

This clause of Part 1 is applicable except as follows.

30.2.1 *Modification:*

The glow-wire test is carried out at 650 °C.

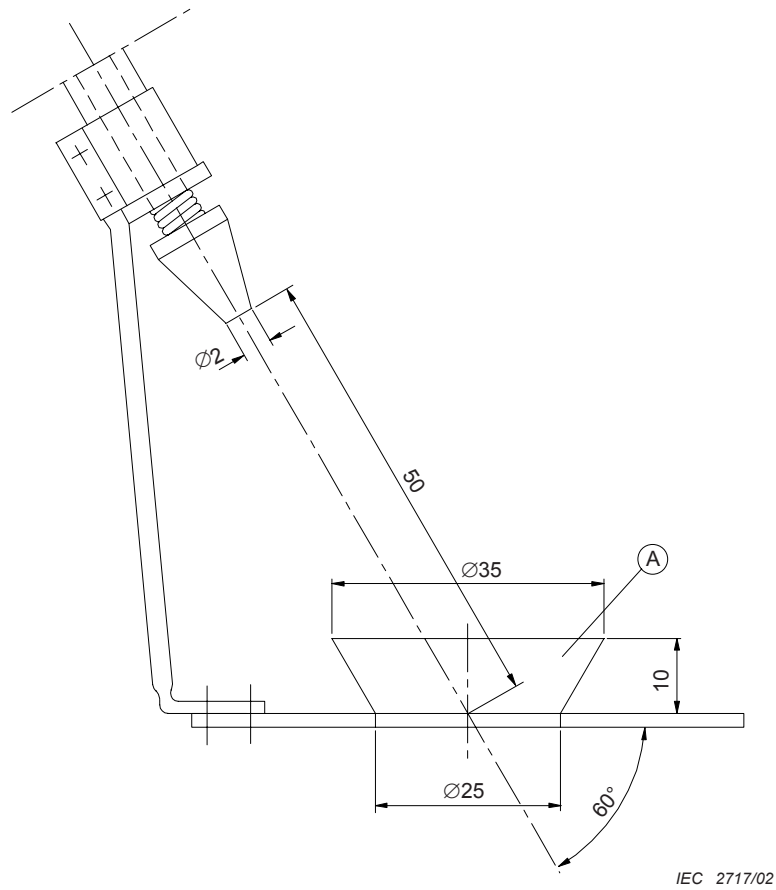
30.2.2 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Dimensions in millimetres

Key

A Bowl

Figure 101 – Splash apparatus

Annexes

The annexes of Part 1 are applicable except as follows.

Annex N (normative)

Proof tracking test

6.3 *Addition:*

Add 250 V to the list of specified voltages.

Annex ZC
(normative)**Normative references to international publications
with their corresponding European publications**

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60436	– ¹⁾	Methods for measuring the performance of electric dishwashers	²⁾	

¹⁾ undated reference.

²⁾ EN 50242:1998, which is related to, but not directly equivalent with, IEC 60436:1981, applies instead.

Annex ZE
(normative)

Specific additional requirements for appliances and machines with power driven moving parts and intended for commercial use

The following modifications to this standard are applicable for appliances and machines with power driven moving parts and intended for commercial use.

NOTE The additional paragraphs to Annex ZE of Part 1 are numbered starting with ZE.101.

Introduction

Replacement:

For the verification of compliance of appliances or machines intended for commercial use with the Essential Health and Safety Requirements (EHSR) of the Directive 2006/42/EC, the requirements in this Annex ZE shall apply.

1 Scope

Add the following:

This annex deals with additional requirements concerning appliances and machines intended to be used by experts or trained users for example in restaurants, canteens, hospitals and commercial enterprises such as bakeries, butcheries, etc and appliances and machines which are declared to be for commercial use by lay persons.

Products covered by this standard do not create a noise hazard, therefore no specific provisions concerning noise are given.

2 Normative references

Add the following normative reference

EN ISO 14159:2008, Safety of machinery - Hygiene requirements for the design of machinery (ISO 14159:2002)

3 Definitions

This clause of Annex ZE of Part 1 is applicable.

4 General requirement

This clause of Annex ZE of Part 1 is applicable.

7 Marking and instructions

This clause of Annex ZE of Part 1 is applicable except as follows:

7.12 Modification

Add the following dashed items:

- the intended use of the appliance as covered by the scope of this standard;
- instructions regarding user maintenance and operation of the appliance and, if necessary, instructions for the training of operators
- instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;
- the conditions under which the appliance is stable during use, dismantling when out of use, testing or foreseeable breakdowns; **Annex ZE.101**

- ☐₁₁ – the operating method to be followed in the event of accident or breakdown to prevent unsafe actions.
- information regarding the use of personal protection equipment in case of spreading hot food stuff.
 - warning concerning possible slippery floor adjacent to the appliance.

7.12.Z1 *Replace the sixth dashed item by the following:*

- on airborne noise emissions, the A-weighted sound pressure level is below 70 dB(A).

Add the following subclause:

7.12.ZE.101 The instructions shall include the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance. At least, it shall include the substance of the following.

WARNING: Appliances must be disconnected from their power supply during cleaning or maintenance and when replacing parts.

21 Mechanical strength

This clause of Annex ZE of Part 1 is applicable.

22 Construction

This clause of Annex ZE of Part 1 is applicable except as follows:

22.ZE.1

This clause of Annex ZE of Part 1 is not applicable.

22.ZE.5

Replace the second paragraph of the test specification by:

*The **guard** is opened at the extent needed to cause the interlocking to operate and is then closed. This operation is carried out for 5 000 cycles at a rate of 5 cycles per min.*

Add the following new subclauses:

22.ZE.101 Controls shall be

- clearly visible and identifiable,
- positioned within easy reach of the operator's hand,
- secured against accidental actuation, if their actuation could result in a hazard.

Compliance is checked by inspection and by manual test if necessary.

22.ZE.102 Appliances shall comply with the hygiene requirements.

Compliance is checked by inspection and by the requirements of EN ISO 14159.

22.ZE.103 Appliances shall meet ergonomic principles.

Compliance is checked by inspection

NOTE Guidance may be found in EN 614-1 and EN 614-2. ☐₁₁

Ⓒ11 Annex ZZ
(informative)

Coverage of Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Union and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex I of the EU Directive 2006/42/EC.

Compliance with this standard, including the requirements of Annex ZE, provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EU Directives may be applicable to the products falling within the scope of this Standard. Ⓒ11

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

EN 614-1:2006 + A1:2009, *Safety of machinery – Ergonomic design principles – Part 1: Terminology and general principles*

EN 614-2:2000 + A1:2008, *Safety of machinery – Ergonomic design principles – Part 2: Interactions between the design of machinery and work tasks*

IEC 60335-2-50, *Household and similar electrical appliances – Safety – Part 2-50: Particular requirements for commercial electric bains-marie*

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

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