

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household and similar electrical appliances – Safety –
Part 2-49: Particular requirements for commercial electric appliances for keeping
food and crockery warm

Appareils électrodomestiques et analogues – Sécurité –
Partie 2-49: Règles particulières pour les appareils électriques à usage collectif
destinés à maintenir au chaud les aliments et la vaisselle



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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-49: Particular requirements for commercial electric appliances
for keeping food and crockery warm**

FOREWORD

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

This consolidated version of IEC 60947-6-2 consists of the fourth edition (2002) [documents 61E/404/FDIS and 61E/416/RVD] and its amendment 1 (2008) [documents 61E/617/FDIS and 61E/620/RVD].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 4.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

The French version of this standard has not been voted upon.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for 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 in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

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

NOTE 3 The following print types are used:

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

Words in **bold** in the text are defined in Clause 3. When a definition of Part 1 concerns an adjective, the adjective and the associated noun are also in bold.

The following differences exist in the countries indicated below.

- 6.1: Class 01 appliances are allowed (Japan).
- 6.2: For appliances intended to be installed in a kitchen, an appropriate degree of protection against harmful ingress of water is required according to their height of installation (France).
- 13.2: Leakage current limits are different (Japan).
- Clause 21: For appliances intended to be installed in a kitchen, different values of impact energy are applicable according to the height of the impact point (France).

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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

It is the recommendation of the committee that the content of the amendment 1 be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

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 hot cupboards

1 Scope

This clause of Part 1 is replaced by the following:

This International Standard deals with the safety of electrically operated commercial appliances for keeping food and crockery warm 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.

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**.

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 This standard does not apply to

- appliances designed 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);
- continuous process appliances for the mass production of food;
- bains-marie (IEC 60335-2-50).

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 paced 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.

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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**.

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**

a special fixed construction containing supply facilities for appliances installed in conjunction with it

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

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.10 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.

6.2 Addition:

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

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

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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.

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.

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:

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

If symbols IEC 60417-5021 (2002-10), IEC 60417-5041 (2002-10) and IEC 60417-5140 (2003-04) are marked on the appliance, their meaning shall be explained.

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.

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 initial installation, the instruction sheet shall give recommendations regarding the rating of **protective devices**, such as earth leakage relays, to be installed.

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**.

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

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.

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.

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.

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.

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 %.

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).

11 Heating

This clause of Part 1 is applicable except as follows.

11.1 Addition:

For **radiant heaters**, 11.101 applies.

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.

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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.

11.4 Replacement:

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

*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.*

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.*