

# INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –  
Part 2-25: Particular requirements for microwave ovens, including combination  
microwave ovens**

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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-25: Particular requirements for microwave ovens, including combination microwave ovens

#### 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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.**

International Standard IEC 60335-2-25 has been prepared by subcommittee 61B: Safety of microwave ovens for household and commercial use, of IEC technical committee 61: Safety of household and similar electrical appliances.

This seventh edition cancels and replaces the sixth edition published in 2010, Amendment 1:2014 and Amendment 2:2015. This edition constitutes a technical revision.

This edition includes the following significant changes with respect to the sixth edition:

- 11.7 and 19.13 are improved in clarity;
- in 19.102, a note is converted into normative text;
- 19.101 is improved with an alternative measurement method;
- 22.121 is improved with requirements for simultaneous activation of heating elements and motors;
- 15.2, 15.101, 21, 22.102, 22.112, 22.119, 22.120, 24.101 and 27.1 are improved in clarity;
- Annex A has editorial improvements and feasible limits of deviations.

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

CDV	RVC
61B/611/CDV	61B/626/RVC
61B/615/CDV	61B/627/RVC
61B/621/CDV	61B/628/RVC
61B/622/CDV	61B/629/RVC
61B/623/CDV	61B/630/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) of that standard.

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

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for microwave ovens, including combination microwave ovens.

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

NOTE 2 The following numbering system is used:

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

NOTE 3 The following print types are used:

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC 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 can need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

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

The following differences exist in the countries indicated below.

- 5.3: Microwave leakage is not to exceed 10 W/m<sup>2</sup> during the initial test (Japan and USA).
- 6.1: **Microwave ovens** may be **class 0I** if the **rated voltage** does not exceed more than 150 V (Japan).
- 7.12: Specific instructions exist pertaining to using and servicing **microwave ovens** with respect to the risk of exposure to microwave energy (USA).
- 7.12: It is prohibited to place the appliance in a cabinet with a door (Japan).
- Clause 18: The test is carried out on two appliances (USA).
- 19.11.2: The input voltage variation is not applied (USA).
- 19.13: Microwave leakage is measured only at the end of each test (USA).
- 21.102: The applied force is 222 N (USA).
- 21.105: Microwave leakage is not to exceed 50 W/m<sup>2</sup> (Japan and USA).
- 22.111: Microwave leakage is measured only at the end of the test (USA).
- 22.112: Microwave leakage is not to exceed 50 W/m<sup>2</sup> (Japan and USA).
- 22.115: All access to the **cavity** has to be prevented (USA).

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



## INTRODUCTION

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

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 which 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 2-25: Particular requirements for microwave ovens, including combination microwave ovens

#### 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of **microwave ovens** for household and similar use, their **rated voltage** being not more than 250 V.

This standard also deals with **combination microwave ovens**, for which Annex AA is applicable.

This standard also deals with **microwave ovens** intended to be used on board ships, for which Annex BB is applicable.

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. However, if the appliance is intended to be used professionally to process food for commercial purposes, the appliance is not considered to be for household and similar use only.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- persons (including children) whose
  - physical, sensory or mental capabilities; or
  - lack of experience and knowledgeprevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

NOTE 101 Attention is drawn to the fact that

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

NOTE 102 This standard does not apply to

- commercial **microwave ovens** (IEC 60335-2-90);
- industrial microwave heating equipment (IEC 60519-6);
- appliances for medical purposes (IEC 60601);
- 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).

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

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

IEC 60335-2-5:2012, *Household and similar electrical appliances – Safety – Part 2-5: Particular requirements for dishwashers*

IEC 60335-2-6:2014, *Household and similar electrical appliances – Safety – Part 2-6: Particular requirements for stationary cooking ranges, hobs, ovens and similar appliances*

IEC 60335-2-9, *Household and similar electrical appliances – Safety – Part 2-9: Particular requirements for grills, toasters and similar portable cooking appliances*

## 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

**3.1.7** Addition:

NOTE 101 The **rated frequency** is the input frequency.

**3.1.9** Replacement:

### **normal operation**

operation of the appliance with 1 000 g ± 50 g of potable water at an initial temperature of 20 °C ± 2 °C in a cylindrical borosilicate glass vessel having a maximum thickness of 3 mm and an outside diameter of approximately 190 mm. The vessel is placed on the centre of the **shelf**

### **3.101**

#### **microwave oven**

appliance using electromagnetic energy in one or several of the ISM frequency bands<sup>1</sup> between 300 MHz and 30 GHz, for heating food and beverages in a **cavity**

### **3.102**

#### **combination microwave oven**

**microwave oven** in which heat is also provided in the **cavity** by simultaneous or consecutive operation of resistive heating elements

Note 1 to entry: The resistive heating elements are used to provide radiant heat, convection heat or steam.

### **3.103**

#### **cavity**

space enclosed by the inner walls and the door in which the load is placed

<sup>1</sup> ISM frequency bands are the electromagnetic frequencies established by the ITU and reproduced in CISPR 11.

### 3.104

#### **shelf**

horizontal support in the **cavity** on which the load is placed

### 3.105

#### **door interlock**

device or system that prevents the operation of the magnetron, unless the oven door is closed

### 3.106

#### **monitored door interlock**

**door interlock** system that incorporates a supervision device

### 3.107

#### **temperature-sensing probe**

device that is inserted into the food to measure its temperature and is a part of an oven control

## 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.

### 5.2 Addition:

NOTE 101 An additional sample **may** be required for the test of 19.104.

NOTE 102 Six samples of the interlocks are required for the test of 24.1.4.

### 5.3 Modification:

*Instead of carrying out the tests in the order of clauses, the following sequence of clauses and subclauses applies: Clause 32, 22.113, 22.108, 22.115, 22.116, Clause 7 to 17, Clause 20, Clause 21 (except 21.101 to 21.105), Clause 18, Clause 19 (except 19.104), Clause 22 (except 22.108, 22.113, 22.115 and 22.116), Clause 23 to 31, 21.101 to 21.105 and 19.104.*

**5.101 Microwave ovens are tested as motor-operated appliances.**

**5.102 Class III temperature-sensing probes are only subjected to the tests of 22.112.**

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Modification:

**Microwave ovens shall be class I or class II.**

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

Appliances shall be marked with the nominal frequency in megahertz of the ISM band in which they operate.

If the removal of any cover results in microwave leakage exceeding the value specified in Clause 32, the cover shall be marked with the substance of the following:

**WARNING  
MICROWAVE ENERGY  
DO NOT REMOVE THIS COVER**

If an appliance incorporates a socket-outlet protected by means of fuses, other than D-type fuses, it shall be marked with the rated current of the relevant fuse. When a miniature fuse-link is provided, this marking shall indicate that the fuse-link is to have a high breaking capacity.

#### **7.12 Addition:**

The instructions shall state the substance of the following:

**IMPORTANT SAFETY INSTRUCTIONS  
READ CAREFULLY AND KEEP FOR FUTURE REFERENCE**

The instructions shall include the substance of the following warnings:

- **WARNING:** If the door or door seals are damaged, the oven must not be operated until it has been repaired by a competent person.
- **WARNING:** It is hazardous for anyone other than a competent person to carry out any service or repair operation that involves the removal of a cover which gives protection against exposure to microwave energy.
- **WARNING:** Liquids and other foods must not be heated in sealed containers since they are liable to explode.

The instructions shall include the substance of the following:

- This appliance is intended to be used in household and similar applications such as:
  - staff kitchen areas in shops, offices and other working environments;
  - farm houses;
  - by clients in hotels, motels and other residential environments;
  - bed and breakfast type environments.

**NOTE 101** If the manufacturer wishes to limit the use of the appliance to less than the above, this has to be clearly stated in the instructions.

- The minimum height of free space necessary above the top surface of the oven.
- Only use utensils that are suitable for use in **microwave ovens**.
- **Metallic containers for food and beverages are not allowed during microwave cooking. This requirement is not applicable if the manufacturer specifies size and shape of metallic containers suitable for microwave cooking.**
- When heating food in plastic or paper containers, keep an eye on the oven due to the possibility of ignition.
- The **microwave oven** is intended for heating food and beverages. Drying of food or clothing and heating of warming pads, slippers, sponges, damp cloth and similar may lead to risk of injury, ignition or fire.
- If smoke is observed, switch off or unplug the appliance and keep the door closed in order to stifle any flames.
- Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container.

- The contents of feeding bottles and baby food jars shall be stirred or shaken and the temperature checked before consumption, in order to avoid burns.
- Eggs in their shell and whole hard-boiled eggs should not be heated in **microwave ovens** since they may explode, even after microwave heating has ended.
- Details for cleaning door seals, **cavities** and adjacent parts.
- The oven should be cleaned regularly and any food deposits removed.
- Failure to maintain the oven in a clean condition could lead to deterioration of the surface that could adversely affect the life of the appliance and possibly result in a hazardous situation.
- Only use the temperature probe recommended for this oven (for appliances having a facility to use a **temperature-sensing probe**).
- The instructions for use for **fixed appliances** and **built-in appliances** being used equal or higher than 900 mm above the floor and having **detachable** turntables shall state that care should be taken not to displace the turntable when removing containers from the appliance. This is not applicable for appliances with horizontal bottom hinged door.
- The appliance shall not be cleaned with a steam cleaner.

The manufacturer shall state in the instructions whether the **microwave oven** is intended to be used freestanding, built-in or in a cabinet. If the appliance can be used while placed in a cabinet,

- the minimum dimensions of the cabinet shall be given by the manufacturer, and
- the instructions shall state that the appliance must be operated with any cabinet door open.

The instructions for **microwave ovens** having an additional decorative door shall state that the appliance must be operated with the decorative door open.

The instructions for **microwave ovens** that are not tested in a cabinet shall state that the appliance must not be placed in a cabinet.

The instructions for **microwave ovens** that are not in compliance with 22.118 shall state that the appliance must not be installed equal or higher than 900 mm above the floor.

#### 7.14 Addition:

The height of the lettering of the warning specified in 7.1 shall be at least 3 mm.

*Compliance is checked by measurement.*

## 8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

### 8.1.1 Addition:

*Test probe 18 of IEC 61032 is also applied, as specified for test probe B. However, it is only applied to parts that are accessible when the oven is operated in normal use.*

### 8.2 Addition: