# IEC 60335-2-90

Edition 3.2 2014-09

# CONSOLIDATED VERSION

# VERSION CONSOLIDÉE

colour inside

## Household and similar electrical appliances – Safety – Part 2-90: Particular requirements for commercial microwave ovens

## Appareils électrodomestiques et analogues – Sécurité – Partie 2-90: Règles particulières pour les fours à micro-ondes à usage commercial



IEC 60335-2-90:2006-02+AMD1:2010-07+AMD2:2014-09 CSV(en-fr)

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## Appareils électrodomestiques et analogues – Sécurité – Partie 2-90: Règles particulières pour les fours à micro-ondes à usage commercial

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# REDLINE VERSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 2-90: Particular requirements for commercial microwave ovens

## FOREWORD

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**This Consolidated version of IEC 60335-2-90 bears the edition number 3.2. It consists of the third edition (2006-02) [documents 61B/306/FDIS and 61B/311/RVD], its amendment 1 (2010-07) [documents 61B/416/FDIS and 61B/424/RVD] and its amendment 2 (2014-09) [documents 61B/500/FDIS and 61B/506/RVD]. The technical content is identical to the base edition and its amendments.**

**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions and deletions are displayed in red, with deletions being struck through. A separate Final version with all changes accepted is available in this publication.**

**This publication has been prepared for user convenience.**

This part of international standard IEC 60335 has been prepared by subcommittee 61B: Safety of microwave ovens, of IEC technical committee 61: Safety of household and similar electrical appliances.

Changes in this edition concern requirements for microwave ovens without a cavity door and with transportation means that are intended for commercial use only for the heating of food and beverages.

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.

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 microwave ovens.

When a particular subclause of Part 1 is not mentioned in 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** type 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 following differences exist in the countries indicated below.

– 5.3: Microwave leakage is not to exceed 10 W/m² during the initial test (Japan, USA and Canada).
– 6.1: Microwave ovens may be class OI if the rated voltage does not exceed more than 150 V (Japan).
– 7.12: Some warnings have to be marked on the appliance and be visible to the user (Canada).
– 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 only measured 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/m² (Japan and USA).
– 22.111: Microwave leakage is only measured at the end of the test (USA).
– 22.112: Microwave leakage is not to exceed 50 W/m² (Japan and USA).
– 22.116: All access to the cavity has to be prevented (USA).
– 27.2: A terminal for an external equipotential conductor is not required (Japan).

The committee has decided that the contents of the base publication and its amendments 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 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.

**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 2-90: Particular requirements for commercial microwave ovens

## 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with:

– the safety of **microwave ovens** with a cavity door intended for commercial 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.

– the safety of **combination microwave ovens** with a cavity door, the requirements for which are contained in Annex AA.

– the safety of **microwave ovens** without a cavity door and with **transportation means** that are intended for commercial use only, for the heating of food and beverages, the requirements for which are contained in Annex BB.

**Microwave ovens**, covered by annex BB, have **transportation means** for moving the **microwave load** through the **microwave oven**. Requirements for tunnel microwave ovens and several types of microwave vending machines are covered.

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

NOTE 101 In annex BB a microwave oven without a cavity door and with transportation means is described as a **microwave oven**. All clauses of this standard apply to these appliances unless otherwise specified in Annex BB.

This international standard also takes into account **ordinary persons** having access to the **removing area** of the vending machine.

NOTE 102 The appliance may be built into a vending machine, in which case IEC 60335-2-75 may also be applicable.

NOTE 103 Appliances that use non-electrical energy are within the scope of this standard.

In general, this standard does not take into account

– the use of appliances by young children or infirm persons without supervision;

– playing with the appliance by young children.

This international standard does not take into account the use of a **microwave oven** without a **cavity** door and with **transportation means** by **ordinary persons** except in the vicinity of **entrance and exit ports**.

NOTE 104 The rationales for particular microwave exposure conditions and measures related to microwave energy being confined by an open structure are in Annex BB.

NOTE 105 Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;

– for appliances intended to be used in tropical countries, special requirements may be necessary;

– in many countries, the national health authorities, the national authorities responsible for the protection of labour and similar authorities specify additional requirements;

– in many countries, national authorities specify additional requirements to BB.22.119.1;

– responsible for the protection of labour and similar authorities

NOTE 106 This standard does not apply to,

– household **microwave ovens** including **combination microwave ovens** (IEC 60335-2-25)

– 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 2-6: 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 60436:2004, *Electric Dishwashers for household use – Methods for measuring the performance*
Amendment 1: 2009
Amendment 2: 2012



## 3 Definitions

This clause of Part 1 is applicable.



**3.1.7** *Addition:*

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

**3.1.9** *Replacement:*

**normal operation**
operation of the appliance under the following conditions

The appliance is operated 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**. If the **rated microwave power output** exceeds 2 200 W, two such vessels are used and placed contiguously in the **cavity**.

**3.101**
**microwave oven**
appliance using electromagnetic energy in one or several of the ISM frequency bands[1] between 300 MHz and 30 GHz, for heating food and beverages in a **cavity**

**3.102**
**rated microwave power output**
microwave power output assigned to the appliance by the manufacturer

[1] ISM frequency bands are the electromagnetic frequencies established by the ITU and reproduced in CISPR 11.

**3.103**
**cavity**
space enclosed by the inner walls and the door in which the load is placed

**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

*Addition:*

NOTE For more details see figure 104.

**3.108**
**instructed person**
person who is sufficiently instructed and monitored to know how to avoid any danger caused by the operation of **microwave ovens**

**3.109**
**skilled person**
person with suitable professional education, knowledge and experience to discern and to avoid any danger caused by the operation of **microwave ovens**

**3.110**
**ordinary person**
person who is neither a skilled person nor an instructed person

**3.111**
**transportation means**
means to transport the microwave load through the microwave oven

NOTE An example of a **transportation means** is a belt, an arm or an inclined plane.

**3.112**
**load**
food and beverages that can be heated up in a **microwave oven**

**3.113**
**microwave enclosure**
structure that is intended to confine microwave energy to a defined region

NOTE 1 Barriers mounted outside the microwave enclosure are not considered a part of the microwave enclosure.

NOTE 2 A microwave enclosure may consist of a cavity, quarter wave chokes (acting by impedance transformation), mode chokes (acting by field pattern mismatching) and microwave energy absorbers.

**3.114**
**microwave barrier**
physical barrier, which is microwave transparent, limiting access to the **microwave enclosure,** mounted outside the **microwave enclosure** and can only be removed with the aid of tools