

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



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

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



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC online collection - [oc.iec.ch](http://oc.iec.ch)

Discover our powerful search engine and read freely all the publications provided. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Recherche de publications IEC - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC online collection - [oc.iec.ch](http://oc.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60335-2-90

Edition 4.1 2019-11  
CONSOLIDATED VERSION

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



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

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

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 97.040.20

ISBN 978-2-8322-1032-6

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

Currently in preview, click buy full version

# REDLINE VERSION

## VERSION REDLINE



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

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

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	9
3 Terms and definitions .....	9
4 General requirement.....	12
5 General conditions for the tests .....	12
6 Classification.....	12
7 Marking and instructions.....	13
8 Protection against access to live parts.....	15
9 Starting of motor-operated appliances .....	15
10 Power input and current.....	15
11 Heating.....	15
12 Void.....	16
13 Leakage current and electric strength at operating temperature.....	16
14 Transient overvoltages .....	16
15 Moisture resistance .....	16
16 Leakage current and electric strength.....	16
17 Overload protection of transformers and associated circuits .....	17
18 Endurance.....	17
19 Abnormal operation .....	18
20 Stability and mechanical hazards.....	20
21 Mechanical strength .....	20
22 Construction.....	22
23 Internal wiring.....	27
24 Components.....	27
25 Supply connection and external flexible cords .....	28
26 Terminals for external conductors.....	28
27 Provision for earthing .....	29
28 Screws and connections.....	29
29 Clearances, creepage distances and solid insulation .....	29
30 Resistance to heat and fire.....	29
31 Resistance to rusting.....	29
32 Radiation, toxicity and similar hazards.....	29
Annex A (informative) Routine tests.....	31
Annex AA (normative) Combination microwave ovens.....	33
Annex BB (normative) Requirements for commercial microwave ovens without a cavity door and with conveyor-type means.....	35
Annex CC (informative) Overview of the requirements for covers, means of access and similar.....	48
Annex DD (informative) Rationales for the microwave barrier and associated leakage tests .....	49

Annex EE (normative) Microwave ovens intended to be used on board ships.....	55
Bibliography.....	58
Figure 101 – Test rod for interlock concealment.....	30
Figure BB.1 – Splash apparatus.....	45
Figure BB.2 – Arrangement for measurement of microwave leakage from access openings.....	46
Figure BB.3 – Examples of definitions of Clause 3 and Clause BB.3.....	47
Table 101 – Number of potatoes.....	19
Table BB.101 – Specifications for microwave barriers.....	12

Currently in preview, click buy full version

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-90: Particular requirements for commercial 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

**This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.**

IEC 60335-2-90 edition 4.1 contains the fourth edition (2015-08) [documents 61B/529/DIS and 61B/536/RVD] and its amendment 1 (2019-11) [documents 61B/618/CDV and 61B/631/RVC, 61B/619/CDV and 61B/632/RVC, 61B/617/CDV and 61B/633/RVC, 61B/616/CDV and 61B/634/RVC, 61B/612/CDV and 61B/635/RVC, 61B/620/CDV and 61B/636/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This fourth edition constitutes a technical revision.

The principal changes with respect to the previous edition are as follows (minor and editorial changes are not listed):

- a statement in 7.12 is required for appliances intended to be used on commercial road vehicles;
- a statement in 7.12 is required concerning cleaning of the appliance with a water jet;
- the replacement of 22.103, 22.104 and 22.105 allows interlock systems with at least one concealed door interlock as well as alternative interlock systems without concealed door interlock;
- requirements are added for appliances for installation in commercial road vehicle;
- an annex is added dealing with routine tests.

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

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 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/m<sup>2</sup> 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/m<sup>2</sup> (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/m<sup>2</sup> (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).

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.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC website 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 document 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 **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 trains, on board ships or board 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.