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EE.22.103 Shelves shall have a non-detachable slip resistant top surface.

Compliance is checked by inspection and the following test.

The top surface of the **shelf** is coated with cooking oil. The appliance is placed with the door forwards on and fixed to a surface which can be tilted downwards to the right in one direction by 12°. An empty dinner plate as described as item No. 1 in Clause A.2 of IEC 60436:2004 is used for the test and placed centrally on the **shelf**. The oven is then slowly tilted.

In a second test and for **microwave ovens** with rotatable **shelves**, the **shelf** is rotated by 90°, the plate is again placed centrally and the **microwave oven** is then slowly tilted. For **microwave ovens** with **non-detachable shelves**, the **microwave oven** is rotated by 90°, the plate is again placed centrally and the **microwave oven** is then slowly tilted.

During each of these tests, the plate shall not slide onto a raised shelf periphery if any, or onto the cavity wall.

NOTE During the tests, the oven is not energised and it is possible that the cavity door is open.

#### EE.31 Resistance to rusting

Addition to this clause of Part 1:

Compliance is checked by the salt mist test Kb of IEC 60068-2-52:

- for **open deck** use, severity 1 is applicable;
- for dayrooms use, severity 2 is applicable.

Before the test, coatings are scratched by means a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm  $\pm$  0,02 mm. The pin is loaded so that the force exerted along its axis is 10 N  $\pm$  0,5 N. The scratches are made by drawing the pin along the surface of the coating at the speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.

After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clauses 8 and 27, is impaired. The coating shall not be broken and shall not have detached from the metal surface.

#### Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-25, Household and similar electrical appliances – Safety – Part 2-25: Particular requirements for microwave ovens, including combination microwave ovens

IEC 60335-2-36, Safety of household and similar electrical appliances – Part 2-36: Particular requirements for commercial electric cooking ranges, ovens, hobs and hob elements

IEC 60335-2-42, Safety of household and similar electrical appliances — Part 2-42: Particular requirements for commercial electric forced convection ovens, steam cookers and steam-convection ovens

IEC 60335-2-49, Household and similar electrical appliances – Safety – Part 2-49: Particular requirements for commercial electric hot cupboards

IEC 60335-2-75, Safety of household and similar electrical appliances – Part 2: Particular requirements for commercial dispensing appliances and vending machines

IEC 60519-6, Safety in electroheat installations – Part 6: Specifications for safety of industrial microwave heating equipment

IEC 60601 (all parts), Medical electrical equipment

IEC 60989, Separating transformers, autotransformers, variable transformers and reactors

IEC 61270-1, Capacitors for microwave ovens – Part 1: General

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Edition 4.1 2019-11

# **FINAL VERSION**

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

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#### 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.
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This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60335-2-90 bears the edition number 4.1. It consists of the fourth edition (2015-08) [documents 61B/529/FDIS 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]. The technical content is identical to the base edition and its amendment.

Cette version Finale ne montre pas les modifications apportées au contenu technique par l'amendement 1. Une version Redline montrant toutes les modifications est disponible dans cette publication.

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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 vehicles;
- 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).

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- 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 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.

A bilingual version of this publication may be issued at a later date.

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.

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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 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.