



SLOVENSKI STANDARD  
SIST EN 60335-2-90:1998  
01-junij-1998

**Safety of household and similar electrical appliances - Part 2: Particular requirements for commercial microwave ovens**

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

Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke -- Teil 2-90: Besondere Anforderungen an gewerbliche Mikrowellenkochgeräte

Sécurité des appareils électrodomestiques et analogues -- Partie 2-90: Règles particulières pour les fours à micro-ondes à usage commercial

<https://standards.iteh.ai/catalog/standards/sist/018df63f-ed6d-4140-baa1-ab41741b80d6/sist-en-60335-2-90-1998>

**Ta slovenski standard je istoveten z: EN 60335-2-90:1997**

**ICS:**

97.040.20      Cooking ranges, working tables, ovens and similar appliances

**SIST EN 60335-2-90:1998**      en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 60335-2-90:1998](#)

<https://standards.iteh.ai/catalog/standards/sist/018df63f-ed6d-4140-baa1-ab41741b80d6/sist-en-60335-2-90-1998>

EUROPEAN STANDARD

EN 60335-2-90

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1997

ICS 97.040.20

Descriptors: Household electrical appliances, microwave ovens, appliance for commercial use, safety requirements, protection against electric shock, fire protection, protection against mechanical hazard

English version

**Safety of household and similar electrical appliances**  
**Part 2: Particular requirements for commercial microwave ovens**  
 (IEC 60335-2-90:1997)

Sécurité des appareils  
 électrodomestiques et analogues  
 Partie 2: Règles particulières pour les  
 fours à micro-ondes à usage commercial  
 (CEI 60335-2-90:1997)

Sicherheit elektrischer Geräte für den  
 Hausgebrauch und ähnliche Zwecke  
 Teil 2: Besondere Anforderungen an  
 gewerbliche Mikrowellenkochgeräte  
 (IEC 60335-2-90:1997)

**(standards.iteh.ai)**

[SIST EN 60335-2-90:1998](https://standards.iteh.ai/catalog/standards/sist/018df63f-ed6d-4140-baa1-ab41741b80d6/sist-en-60335-2-90-1998)

<https://standards.iteh.ai/catalog/standards/sist/018df63f-ed6d-4140-baa1-ab41741b80d6/sist-en-60335-2-90-1998>

This European Standard was approved by CENELEC on 1997-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

# CENELEC

European Committee for Electrotechnical Standardization  
 Comité Européen de Normalisation Electrotechnique  
 Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

### Foreword

The text of document 61B/111/FDIS, future first edition of IEC 60335-2-90, prepared by SC 61B of the IEC Technical Committee 61 was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60335-2-90 on 1997-10-01.

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-07-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2000-07-01

For products which have complied with the relevant national standard before 2000-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2005-07-01.

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard. Amendments and revisions of part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for commercial 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 of part 1 is to be adapted accordingly.

Subclauses and tables which are additional to those in part 1 are numbered starting with 101.

There are no special national conditions causing a deviation from this European Standard, other than those listed in annex ZA to EN 60335-1.

There are no national deviations from this European Standard, other than those listed in annex ZB to EN 60335-1.

NOTE - 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 2. When a definition of part 1 concerns an adjective, the adjective and the associated noun are also in bold.

---

### Endorsement notice

The text of the International Standard IEC 60335-2-90:1997 was approved by CENELEC as a European Standard without any modification.

---



NORME  
INTERNATIONALE

CEI  
IEC

INTERNATIONAL  
STANDARD

60335-2-90

Première édition  
First edition  
1997-09

**Sécurité des appareils électrodomestiques  
et analogues –**

**Partie 2:  
Règles particulières pour les fours à micro-ondes  
à usage commercial**

ITeH STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN 60335-2-90:1998  
<https://standards.iteh.ai/catalog/standards/sist/018d165f-ed0d-4140-baa1-4b41741668/sist-en-60335-2-90-1998>  
**Safety of household and similar  
electrical appliances –**

**Part 2:  
Particular requirements for commercial  
microwave ovens**

© IEC 1997 Droits de reproduction réservés — Copyright - all rights reserved

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'éditeur.

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 the publisher.

International Electrotechnical Commission  
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland  
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

S

Pour prix, voir catalogue en vigueur  
For price, see current catalogue

## CONTENTS

	Page
FOREWORD .....	5
Cause	
1 Scope .....	9
2 Definitions .....	11
3 General requirement .....	11
4 General conditions for the tests .....	13
5 Void .....	13
6 Classification .....	13
7 Marking and instructions .....	13
8 Protection against access to live parts .....	15
9 Starting of motor-operated appliances .....	17
10 Power input and current .....	17
11 Heating .....	17
12 Void .....	17
13 Leakage current and electric strength at operating temperature .....	17
14 Void .....	17
15 Moisture resistance .....	19
16 Leakage current and electric strength .....	19
17 Overload protection of transformers and associated circuits .....	21
18 Endurance .....	21
19 Abnormal operation .....	21
20 Stability and mechanical hazards .....	25
21 Mechanical strength .....	27
22 Construction .....	31
23 Internal wiring .....	39
24 Components .....	39
25 Supply connection and external flexible cords .....	41
26 Terminals for external conductors .....	41
27 Provision for earthing .....	43
28 Screws and connections .....	43
29 Creepage distances, clearances and distances through insulation .....	43
30 Resistance to heat, fire and tracking .....	45
31 Resistance to rusting .....	45
32 Radiation, toxicity and similar hazards .....	45

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF HOUSEHOLD AND SIMILAR  
ELECTRICAL APPLIANCES –****Part 2: Particular requirements for  
commercial microwave ovens**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

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.

It forms the first edition of IEC 60335-2-90.

The text of this standard is based on the following documents:

FDIS	Report on voting
61B/111/FDIS	61B/117/RVD

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

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 third edition (1991) of that standard.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert it into the IEC standard: *Safety requirements for commercial microwave ovens*.

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

## NOTES

- 1 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 2. When a definition of part 1 concerns an adjective, the adjective and the associated noun are also in bold.

2 Subclauses, tables and figures which are additional to those in part 1 are numbered starting from 101. Annexes which are additional to those in part 1 are lettered AA, BB, etc.

The following additional differences exist in some countries:

- 4.3: 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).
- 7.12.1: Some warnings have to be marked on the appliance and be visible to the user (New Zealand and 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).
- 22.115: All access to the cavity has to be prevented (USA).
- 7.2: A terminal for an external equipotential conductor is not required (Japan).

(standards.iteh.ai)

SIST EN 60335-2-90:1998

<https://standards.iteh.ai/catalog/standards/sist/018df63f-ed6d-4140-baa1-ab41741b80d6/sist-en-60335-2-90-1998>



## SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –

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

#### 1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of **microwave ovens** intended for commercial use, the **rated voltage** being not more than 250 V for single-phase appliances connected between one phase and neutral and 480 V for other appliances.

Appliances covered by this standard incorporate a door for user access to the **cavity**.

#### NOTES

- 1 The appliance may be built into a vending machine, in which case IEC 60335-2-75 may also be applicable.
- 2 IEC 60335-2-36 or IEC 60335-2-42 may also be applicable to ovens incorporating conventional heating means.
- 3 Appliances that use non-electrical energy are within the scope of this standard.

This standard does not in general take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

#### NOTES

- 4 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, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.
- 5 This standard does not apply to
  - household **microwave ovens** (IEC 60335-2-25);
  - household combination **microwave ovens** (IEC 60335-2-100)<sup>1)</sup>;
  - conveyor type microwave appliances;
  - industrial microwave heating equipment (IEC 60519-6)<sup>2)</sup>;
  - appliances for medical purposes (IEC 60601)<sup>3)</sup>;
  - 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).

<sup>1)</sup> To be published.

<sup>2)</sup> IEC 60519-6: 1982, *Safety in electroheat installations – Part 6: Specifications for safety in industrial microwave testing equipment*.

<sup>3)</sup> IEC 60601: *Medical electrical equipment*.

## 2 Definitions

This clause of part 1 is applicable except as follows:

### 2.2.7 Addition:

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

### 2.2.9 Replacement:

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

The appliance is operated with  $1\ 000\text{ g} \pm 50\text{ g}$  of potable water at an initial temperature of  $20\text{ °C} \pm 2\text{ °C}$  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**.

2.101 **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**.

2.102 **rated microwave power output:** Microwave power output assigned to the appliance by the manufacturer.

2.103 **cavity:** Space enclosed by the inner walls and the door, and in which the load is placed.

2.104 **shelf:** Horizontal support in the **cavity** on which the load is placed.

2.105 **door interlock:** Device or system which prevents the operation of the magnetron unless the oven door is closed.

2.106 **monitored door interlock:** **Door interlock** system which incorporates a supervision device.

2.107 **temperature sensing probe:** Device which is inserted into the food to measure its temperature and which is a part of an oven control.

## 3 General requirement

This clause of part 1 is applicable.

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

#### 4 General conditions for the tests

This clause of part 1 is applicable except as follows:

##### 4.2 Addition:

NOTE – An additional sample may be required for the test of 19.104. Six samples of the interlocks are required for the test of 24.101.

##### 4.3 Modification:

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

4.101 Unless otherwise specified, **microwave ovens** are tested as **motor-operated appliances**.

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

#### 5 Void

#### 6 Classification

This clause of part 1 is applicable except as follows:

##### 6.1 Addition:

**Microwave ovens shall be of class I.**

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)  
<http://standards.iteh.ai/catalog/standards/sist/018df63f-ed6d-4140-baa1-ab41741b80d6/sist-en-60335-2-90-1998>

#### 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.

The appliance shall be marked with the substance of the following warning in lettering at least 3 mm high. The warning shall be visible when removing any cover, if this results in microwave leakage exceeding the value specified in clause 32.

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.