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Responsible committee: CPL/61/7 Safety of electrical appliances - Heated appliance group

Interested committees:

Title: Draft BS EN 60335-2-90 Ed 5 F1 Household and similar electrical appliances - Safety. Part 2-90: Particular requirements for commercial microwave ovens (Fragment 1).

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



61B/669/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:

IEC 60335-2-90/FRAG1 ED5

DATE OF CIRCULATION:

2022-01-14

CLOSING DATE FOR VOTING:

2022-04-08

SUPERSEDES DOCUMENTS:

61B/644/CD, 61B/647A/CC

IEC SC 61B : SAFETY OF MICROWAVE APPLIANCES FOR HOUSEHOLD AND COMMERCIAL USE

SECRETARIAT:

Switzerland

SECRETARY:

Mr Rupert Steiner

OF INTEREST TO THE FOLLOWING COMMITTEES:

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

☐ SUBMITTED FOR CENELEC PARALLEL VOTING

☒ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Household and similar electrical appliances - Safety - Part 2-90: Particular requirements for commercial microwave ovens (Fragment 1)

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

This CDV is the fragment based on TC61 recommendation. The another DC to be submitted by TC61/MT23 will be discussed and may be proceeded to fragment CDV to be merged with this CDV .

There are some yellow colors and strikethrough in this CDV for easier understanding the differences to the current version.

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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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- 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/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].~~

~~This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.~~

This part of International Standard IEC 60335-2-90 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 fifth edition cancels and replaces the fourth edition published 2015 Amendment 1:2019. 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):

This edition includes the following significant changes with respect to the fourth edition published 2015 Amendment 1:2019.

- 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.
- Introduction of the appliance used in area open to the public in 1, 3.8.101, 7.12, 8.1.1, 11.8 and 20.2 including addition of test probe 19.
- 5.5, 7.12.1, 11.2, 11.7, 20.1 and 20.101 are modified to add for stacking installation.
- 7.1, 11.7 and 22.61 are modified for the appliance outlets and socket-outlets.
- 7.12 is improved in clarity.
- Addition of maximum temperature rises of external accessible surfaces in 11.8.
- 15.101 is modified test criterion.
- 19.11.2, 19.13, 21, 22.105, 22.111 and Annex AA are improved in clarity.
- 22.103.2, 22.105 and 22.117 are modified to adopt test probe 18.
- 24.1.10 and 32.101 are added for LED source.
- Annex BB and Annex EE are modified to add screw requirements.

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

CDV	RVC
to be included.	to be included.

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 fourth edition (2001) of that standard.

This Part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

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

153 This Part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to
154 convert that publication into the IEC standard: Safety requirements for commercial microwave
155 ovens.

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

159 NOTE 2 The following numbering system is used:

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

164 NOTE 3 The following print types are used:

- 165 – requirements: in roman type;
- 166 – *test specifications: in italic type;*
- 167 – notes: in small roman type.

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

170 The committee has decided that the contents of this document will remain unchanged until the
171 stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related
172 to the specific publication. At this date, the publication will be

- 173 • reconfirmed,
- 174 • withdrawn,
- 175 • replaced by a revised edition, or
- 176 • amended.

177 NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing
178 organizations can need a transitional period following publication of a new, amended or revised IEC publication in
179 which to make products in accordance with the new requirements and to equip themselves for conducting new or
180 revised tests.

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

183 The following differences exist in the countries indicated below.

- 184 – 5.3: Microwave leakage is not to exceed 10 W/m² during the initial test (Japan,
185 USA and Canada).
- 186 – 6.1: Microwave ovens may be class OI if the rated voltage does not exceed more
187 than 150 V (Japan).
- 188 – 7.12: Some warnings have to be marked on the appliance and be visible to the
189 user (Canada).
- 190 – Clause 18: The test is carried out on two appliances (USA).
- 191 – 19.11.2: The input voltage variation is not applied (USA).
- 192 – 19.13: Microwave leakage is only measured at the end of each test (USA).
- 193 – 21.102: The applied force is 222 N (USA).
- 194 – 21.105: Microwave leakage is not to exceed 50 W/m² (Japan and USA).
- 195 – 22.111: Microwave leakage is only measured at the end of the test (USA).
- 196 – 22.112: Microwave leakage is not to exceed 50 W/m² (Japan and USA).

- 197 – 22.116: All access to the cavity has to be prevented (USA).
198 – 27.2: A terminal for an external equipotential conductor is not required (Japan).

Note from the secretariat:

NCs are requested to re-confirm the above differences in the countries.

199

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

202 The committee has decided that the contents of the base publication and its amendment will
203 remain unchanged until the stability date indicated on the IEC web site under
204 "http://webstore.iec.ch" in the data related to the specific publication. At this date, the
205 publication will be

206 • reconfirmed,

207 • withdrawn,

208 • replaced by a revised edition, or

209 • amended.

210

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

212 NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing
213 organizations can need a transitional period following publication of a new, amended or revised IEC publication in
214 which to make products in accordance with the new requirements and to equip themselves for conducting new or
215 revised tests.

216 It is the recommendation of the committee that the content of this publication be adopted for implementation
217 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.

218

219

220

221

INTRODUCTION

222 It has been assumed in the drafting of this international standard that the execution of its
223 provisions is entrusted to appropriately qualified and experienced persons.

224 This standard recognizes the internationally accepted level of protection against hazards such
225 as electrical, mechanical, thermal, fire and radiation of appliances when operated as in
226 normal use taking into account the manufacturer's instructions. It also covers abnormal
227 situations that can be expected in practice and takes into account the way in which
228 electromagnetic phenomena can affect the safe operation of appliances.

229 This standard takes into account the requirements of IEC 60364 as far as possible so that
230 there is compatibility with the wiring rules when the appliance is connected to the supply
231 mains. However, national wiring rules may differ.

232 If an appliance within the scope of this standard also incorporates functions that are covered
233 by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as
234 far as is reasonable. If applicable, the influence of one function on the other is taken into
235 account.

236 When a part 2 standard does not include additional requirements to cover hazards dealt with
237 in Part 1, Part 1 applies.

238 NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is
239 not necessary to specify particular requirements for the appliance in question over and above the general
240 requirements.

241 This standard is a product family standard dealing with the safety of appliances and takes
242 precedence over horizontal and generic standards covering the same subject.

243 NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into
244 consideration when developing the general and particular requirements for the IEC 60335 series of standards. For
245 example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as
246 ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

247 An appliance that complies with the text of this standard will not necessarily be considered to
248 comply with the safety principles of the standard if, when examined and tested, it is found to
249 have other features which impair the level of safety covered by these requirements.

250 An appliance employing materials or having forms of construction differing from those detailed
251 in the requirements of this standard may be examined and tested according to the intent of
252 the requirements and, if found to be substantially equivalent, may be considered to comply
253 with the standard.

254

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;

These appliances are not intended for household and similar purposes. They are used for commercial processing of food, also in **areas open to the public**, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries and butcheries.

- 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;

- 299 – for appliances intended to be used in tropical countries, special requirements may be necessary;
- 300 – in many countries, the national health authorities, the national authorities responsible for the protection of
- 301 labour and similar authorities specify additional requirements;
- 302 – in many countries, national authorities specify additional requirements to BB.22.119.1.

303 NOTE 106 This standard does not apply to

304 ~~household microwave ovens including combination microwave ovens (IEC 60335-2-25);~~

305 – **Microwave ovens including combination microwave ovens** for household use covered by IEC 60335-2-25

306 and used in the following environments by laymen:

307 - staff kitchen areas in shops, offices and other working environments;

308 - farm houses;

309 - by clients in hotels, motels and other residential type environments;

310 - bed and breakfast type environments.

311 – industrial microwave heating equipment (IEC 60519-6);

312 – appliances for medical purposes (IEC 60601);

313 – appliances intended to be used in locations where special conditions prevail, such as the presence of a

314 corrosive or explosive atmosphere (dust, vapour or gas).

315 2 Normative references

316 This clause of Part 1 is applicable except as follows.

317 *Addition:*

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

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

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

321 *chloride solution)*

322 IEC 60335-2-36, *Household and similar electrical appliances – Safety – Part 2-36: Particular*

323 *requirements for commercial electric cooking ranges, ovens, hobs and hob elements*

324 IEC 60335-2-42, *Household and similar electrical appliances – Safety – Part 2-42: Particular*

325 *requirements for commercial electric forced convection ovens, steam cookers and steam-*

326 *convection ovens*

327 IEC 60335-2-49, *Household and similar electrical appliances – Safety – Part 2-49: Particular*

328 *requirements for commercial electric hot cupboards*

329 IEC 60335-2-75, *Household and similar electrical appliances – Safety – Part 2-75: Particular*

330 *requirements for commercial dispensing appliances and vending machines*

331 IEC 60436:2004, *Electric dishwashers for household use – Methods for measuring the*

332 *performance*

333 IEC 60436:2004/AMD 1:2009

334 IEC 60436:2004/AMD 2:2012

335 **IEC 60584-1, Thermocouples – Part 1: EMF specifications and tolerances**

336

337 **IEC/TR 62471-2:2009, Photobiological safety of lamps and lamp systems – Part 2: Guidance**

338 **on manufacturing requirements relating to non-laser optical radiation safety**

339

IEC/TR 62778:2014, *Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs with specified property classes – Coarse thread and fine pitch thread*

ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs*

ISO 3506-2, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 2: Nuts*

ISO 3506-3, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 3: Set screws and similar fasteners not under tensile stress*

ISO 3506-4, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 4: Tapping screws*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1.7 Addition:

Note 101 to entry: 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 $1\,000\text{ g} \pm 50\text{ g}$ 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**.

3.8 Definitions relating to miscellaneous matters

3.8.101

area open to the public

area in which the general public, including children, may have access

NOTE to entry: Examples are convenience store, canteens and self-service restaurants.

3.101

microwave oven

appliance using electromagnetic energy in one or several of the ISM frequency bands¹ 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.

- 383 **3.103**
384 **cavity**
385 space enclosed by the inner walls and the door in which the **load** is placed
- 386 **3.104**
387 **shelf**
388 horizontal support in the **cavity** on which the **load** is placed
- 389 **3.105**
390 **door interlock**
391 device or system that prevents the operation of the magnetron unless the oven door is closed
- 392 **3.106**
393 **monitored door interlock**
394 **door interlock** system that incorporates a supervision device
- 395 **3.107**
396 **temperature-sensing probe**
397 device that is inserted into the food to measure its temperature and is a part of an oven
398 control
- 399 **3.108**
400 **instructed person**
401 person who is sufficiently instructed and monitored to know how to avoid any danger caused
402 by the operation of **microwave ovens**
- 403 **3.109**
404 **skilled person**
405 person with suitable professional education, knowledge and experience to discern and to
406 avoid any danger caused by the operation of **microwave ovens**
- 407 **3.110**
408 **ordinary person**
409 person who is neither a **skilled person** nor an **instructed person**
- 410 **3.111**
411 **transportation means**
412 means to transport the **load** through the **microwave oven**
- 413 Note 1 to entry: An example of a **transportation means** is a belt, an arm or an inclined plane.
- 414 **3.112**
415 **load**
416 food and beverages that can be heated up in a **microwave oven**
- 417 **3.113**
418 **microwave enclosure**
419 structure that is intended to confine microwave energy to a defined region
- 420 Note 1 to entry: Barriers mounted outside the **microwave enclosure** are not considered a part of the **microwave**
421 **enclosure**.
- 422 Note 2 to entry: A **microwave enclosure** may consist of a **cavity**, quarter wave chokes (acting by impedance
423 transformation), mode chokes (acting by field pattern mismatching) and microwave energy absorbers.
- 424 **3.114**
425 **microwave barrier**
426 physical barrier, which is microwave transparent, limiting access to the **microwave enclosure**,
427 mounted outside the **microwave enclosure** and can only be removed with the aid of tools

428 Note 1 to entry: A **microwave barrier** may be mounted between the **microwave enclosure** and the external
429 cover of the appliance.

430 Note 2 to entry: Devices such as an array of metal chains or hinged metal plates at **entrance and exit ports**
431 intended to reduce microwave leakage are not considered **microwave barriers**.

432 Note 3 to entry: Construction requirements are given in BB.22.119.

433 **3.115**
434 **entrance and exit ports**
435 openings in the **microwave enclosure** through which **loads** move

436 **3.116**
437 **loading area**
438 area on which the **load** is placed

439 **3.117**
440 **means of monitored microwave interlock**
441 **means of microwave interlock** that incorporates a supervision device

442 **3.118**
443 **protective blocking structure**
444 movable mechanical structure located in the **removing area** limiting access to the **microwave**
445 **enclosure**

446 **3.119**
447 **removing area**
448 area from which the **load** is removed

449 **3.120**
450 **viewing opening**
451 opening in the **cavity** through which the warm up process can be visually monitored

452 **3.121**
453 **fixed means of connection**
454 all parts of the **microwave enclosure** that are permanently open with the exception of
455 **entrance and exit ports** and **viewing openings**

456 Note 1 to entry: **Fixed means of connection** may be used for venting and water flushing.

457 **3.122**
458 **detachable means of access**
459 all parts of the **microwave enclosure** that can be opened or removed without the aid of tools
460 to get access to the inside for maintenance, with the exception of **entrance and exit ports**
461 and **viewing openings**

462 Note 1 to entry: Examples of **detachable means of access** are tunnels that are opened by drop down or sliding
463 action and cavity lamp covers.

464 **3.123**
465 **means of microwave interlock**
466 mechanical or electrical safety devices or systems that operate when certain conditions are
467 not fulfilled (e.g. an interlock system that prevents the operation of the microwave generator
468 when a means of access is open)

469 **3.124**
470 **maintenance cover**
471 structural feature of any part of the equipment that can be opened or removed by the use of a
472 tool to provide access for routine maintenance, service, replacement of expendable parts, etc.
473 in microwave containing areas

3.125**cleaning cover**

part of the **microwave enclosure** that can be opened or removed, only with the aid of a tool, for frequent cleaning purposes, during operation

3.126**reference surface**

surface in the vicinity of entrance and exits ports defined depending on the reading of microwave leakage of Clause BB.32

Note 1 to entry: If the leakage reading is less or equal to 50 W/m^2 , the **reference surface** is the surface of the geometric opening of the **microwave enclosure** without **microwave barrier**.

Note 2 to entry: If the leakage reading exceeds 50 W/m^2 , the **reference surface** is an artificial surface located 50 mm away from the locations where the sensor of the instrument measures leakage readings of 50 W/m^2 straight inwards towards the appliance.

Note 3 to entry: For further explanation, refer to Clause BB.32.

3.127**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.

3.128**hot functional surface**

surface that is intentionally heated by an internal heat source and that has to be hot to carry out the intended function of the appliance

3.129**primary light source**

surface of object emitting light produced by a transformation of energy

[IEC 60050-845:1987, definition 845-07-01]

For the purpose of this document, it may refer to an LED component, an LED module, or a lamp

3.130**LED source**

Light source (any product that produces light) using light emitting diodes to produce light

Note to entry: Examples of light sources are: LED component, LED module, lamp, lighting fixture or luminaire.

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. 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: 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.

5.5 Addition:

The tests are carried out with the appliances in any stacked combination or any movable part of it placed in the most unfavourable condition that may occur in normal use.

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**.

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.~~

If appliances have external enclosures, other than working surfaces, that cannot meet the limit in Table 3 specified for external enclosures of **motor-operated appliances**, they shall be marked with symbol IEC 60417-5041(2002-10) or with the substance of the following:

CAUTION: Hot surface.

If appliances have external **accessible surfaces**, for which temperature rise limits are specified in Table 102 and Table 103 and for which the provisions of footnote b to Table 102 and Table 103 apply, then the appliance shall be marked with symbol IEC 60417-5041 (2002-10) or with the substance of the following:

CAUTION: Hot surface

Appliances incorporating **LED sources** for illumination purposes classified according to sub-clause 24.1.10 are found to be in risk group 2 for retinal blue light hazard, shall be marked, with the symbol IEC 60417-6159-1(2012-12) or the substance of the following:

“CAUTION – Possibly hazardous radiation emitted from this product.”

NOTE 101 According to IEC/TR 62471-2:2009, appliances emitting certain amounts of optical radiation shall be labeled based on the risk group assessment for the hazards of optical radiation.

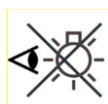
7.6 Addition:



[symbol IEC 60417-5021 (2002-10)] equipotentiality



[symbol IEC 60417-5041 (2002-10)] caution, hot surface



[symbol IEC 60417-6159-1(2012-12)]

Do not stare at light source

7.12 Addition:

The instructions shall include the substance of the following:

- 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 any cover which gives protection against exposure to microwave energy;

NOTE 101 This warning is necessary if microwave leakage exceeds the limit specified in clause 32 during the removal of any cover.

- WARNING: Liquids or other foods must not be heated in sealed containers since they are liable to explode;
- WARNING: Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container;
- WARNING: The contents of feeding bottles and baby food jars must be stirred or shaken and the temperature checked before consumption, in order to avoid burns;
- 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**;
- when heating food in plastic or paper containers, keep an eye on the oven due to the possibility of ignition;
- if smoke is observed, switch off or unplug the appliance and keep the door closed in order to stifle any flames;
- 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 appliance should not be cleaned with a water jet (for appliances intended to stand on the floor and which are not at least IPX5);
- statement on usage on commercial road vehicles (for appliances intended to be used on commercial road vehicles);
- the appliance must not be cleaned with a steam cleaner (for appliances which are not at least IPX5).

NOTE 101 If the oven is incorporated in a vending machine, these warnings and instructions may not be relevant and therefore not required.

~~If symbol IEC 60417-5041 (2002-10) is marked on the appliance, its meaning shall be explained and location of areas where the limits are exceeded shall be stated or shown by a drawing.~~

Note from secretariat: NCs are asked the comments if the above strike-through sentence is deleted to harmonize IEC 60335-2-25.

For appliance incorporating a **LED source** for illumination purposes classified to be in risk group 2 according to clause 32.101 about the retinal blue light hazard and intended to be replaced or cleaned by the user, the instructions shall include the substance of the following:

WARNING: Ensure the lamp and appliance is switched off before replacing or cleaning.

Where symbol IEC 60417-6159-1 (2012-12) is used, the substance of the following shall be included in the instructions:

“CAUTION: Possibly hazardous radiation emitted from this product.”

The manufacturer shall declare that the appliance is also intended to be used in an **area open to the public**, and in that case shall be stated whether this appliance is allowed to be placed or installed less than 850 mm above the floor.

If the appliance is not suitable for use in an **area open to the public**, the instruction shall include the substance of the following warning:

WARNING: This appliance shall not be installed where the public has access.

7.12.1 Addition:

If the installation instructions state that a **microwave oven** can be placed on top of another **microwave oven**, they shall state model or type reference of the suitable **microwave ovens**. Instructions shall be given for the stacking way of the **microwave ovens**. The instructions shall state how to use the fixing attachments, if any, in a correct way. The instructions shall also state the maximum number of stacked **microwave ovens**.

7.14 Addition:

The warning specified in 7.1 shall be in lettering at least 3 mm high.

The warning specified in 7.101 shall be in lettering at least 5 mm high.

The height of the triangle used with symbol IEC 60417-5041 (2002-10) shall be at least 12 mm.

The length of the diagonals in the symbol IEC 60417-6159-1 (2012-12): Do not stare at light source shall be at least 20 mm.

7.15 Addition:

The marking specified for hot surfaces shall be visible when the appliance is operated as in normal use, including when actuating any switch, adjusting any control or opening a lid or door. It shall not be placed on a **hot functional surface** and surfaces that are exempted from the limits in Table 102 and Table 103.

Note from secretariat: NCs are asked the comments if the above the words “hot functional surface” and clause 3.128 are necessary. In new Table 102 and Table 103, the word “hot functional surface” was changed to “Cavity”.

7.101 A label shall be provided, together with instructions for fixing it in a conspicuous place close to the appliance. The label shall state the substance of the following.

- **WARNING:** Liquids or other foods must not be heated in sealed containers since they are liable to explode;
- **WARNING:** Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container;
- **WARNING:** The contents of feeding bottles and baby food jars must be stirred or shaken and the temperature checked before consumption, in order to avoid burns.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of Part 1 is applicable **except as follows**.

8.1.1 Addition:

*For appliances intended to be used in the **area open to the public**, test probe 18 of IEC 61032 is applied, and situated less than 850 mm above the floor, in addition test probe 19 of IEC 61032 is also applied with the same test conditions used for test probe 18.*

8.1.3 Replacement:

The sentence “instead of test probe B, test probe 18 and test probe 13” is replaced with “instead of test probe B, test probe 18, test probe 19 and test probe 13”.

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 Addition:

*Appliances, other than **built-in appliances**, are positioned as specified for **heating appliances**.*

A ceiling is placed over the appliance at the minimum height stated in the instructions. The ceiling has a depth of 300 mm from the back wall of the test corner and a length at least 150 mm in excess of the width of the appliance.

*Appliances intended to be fixed to the floor, **microwave ovens intended to be stacked onto other microwave ovens** and or appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means, are installed in accordance with the installation instructions. If no instructions are supplied, these appliances are placed on the floor as near as possible to the walls of the test corner.*

11.3 Addition:

*Where the external **accessible surfaces** are suitably flat and permit access, the test probe of Figure 102 is used to measure the temperature rises of external **accessible surfaces** specified in Table 102 and Table 103. The probe is applied with a force of $4\text{ N} \pm 1\text{ N}$ to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe can be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe can be used.

11.7 ~~Replacement~~ Modification:

Appliances are operated in cycles, each cycle consisting of a heating period of 4 min followed by a rest period of 1 min until steady conditions are established. The last cycle does not include a rest period of 1 min. Boiling water is added to the water load when half of the water load has evaporated.

NOTE 101 During the rest periods, the current in the appliance outlets and socket-outlets are continuously loaded.

For **microwave ovens** intended to be stacked onto other **microwave ovens**, the tests shall be also conducted under the most unfavourable stacking conditions in accordance with the instructions. In this case, all **microwave ovens** are operated simultaneously under normal use and supplied by the same voltage.

11.8

Replacement:

Replace the first paragraph of Part 1 with the following text:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3, Table 102 and Table 103.

Addition:

For the table 3;

- The temperature rises of external surfaces are only measured on the surfaces that are not placed against the wall and the floor of the test corner.

- There are no temperature limits for air-outlet grilles and for surfaces up to a distance of 25 mm from them. When the required values for external enclosures of **motor-operated appliances** are not met, the maximum temperature rise shall not be higher than two times the values indicated.

Table 102 – Maximum temperature rises

of external accessible surfaces under normal operating conditions

Surface ^a	Temperature rise of external accessible surfaces K ^b
Bare metal	48
Coated metal ^c	59
Glass and ceramic	65
Plastic and plastic coating > 0,4 mm ^{d, e}	74

^a The following surfaces or elements shall not be taken into consideration (see Figure 103):

- **cavity** (NOTE: Surface temperatures are only measured when the door is closed);
- handles or control knobs including keypads, keyboards and the like: part of the equipment that a user needs to touch to operate or adjust the equipment. The equipment has to be installed according to the manufacturer's instructions;
- surfaces within 5 mm of touch controls regardless of their shape;
- external surfaces of appliances which, according to the installation condition of sub clause 11.2, shall be against the walls and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end;
- surfaces on the **microwave oven** door within 10 mm from the left, right and lower edge of the **microwave oven** door, or 25 mm from the upper edge of the **microwave oven** door (Zone 1). For built-in appliances the edges shall be considered between the **microwave oven** door and decorative trims, if any;
- surfaces around the **microwave oven** door within 10 mm from the left, right or lower edge of the **microwave oven** door, or 25 mm from the upper edge of the **microwave oven** door (Zone 2). For built-in appliances the edges shall be considered between the **microwave oven** door and decorative trims, if any;
- surfaces within 25 mm of vents such as air-outlet grilles (Zone 3)

^b When the required values are not met, the maximum temperature rise shall not be higher than two times the values indicated.

^c Metal is considered coated when a coating having a minimum thickness of 90 µm made by enamel, powder coating or non-substantially plastic coating is used.

^d The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.