

# INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –  
Part 2-42: Particular requirements for commercial electric forced convection  
ovens, steam cookers and steam-convection ovens**



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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)

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Edition 6.0 2021-11  
REDLINE VERSION

# INTERNATIONAL STANDARD



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**Household and similar electrical appliances – Safety –  
Part 2-42: Particular requirements for commercial electric forced convection  
ovens, steam cookers and steam-convection ovens**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –**Part 2-42: Particular requirements for commercial electric forced  
convection ovens, steam cookers and steam-convection 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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-42:2002+AMD1:2008+AMD2:2017 CSV. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.**

IEC 60335-2-42 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This sixth edition cancels and replaces the fifth edition published in 2002, Amendment 1: 2008 and Amendment 2:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the text has been aligned with IEC 60335-1:2020;
- b) some notes have been converted to normative text, modified or deleted (Clause 1, 7.15, 9.101, 10.1, 11.7, 19.2, 19.7, 20.101, 21.101, 22.101, 22.114, 27.2, 30.101);
- c) exclusion of battery-operated appliances and appliances used in areas open to the public (Clause 1);
- d) clarification of applicable standard for appliances for use by laymen (Clause 1, 7.12);
- e) relocation of cleaning instructions from 7.12.1 to 7.12;
- f) clarifications to some test specifications have been made (15.1.1, 15.2, 19.2, 19.7, 23.3, 25.3);
- g) introduction of a symbol to indicate risk of scalding (7.6);
- h) conciliation of the text of IEC 60335-2-42 with other standards under IEC/TC61/MT32.

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

| Draft        | Report on voting |
|--------------|------------------|
| 61/6366/FDIS | 61/6416/RVD      |

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

A list of all parts in the IEC 60335 series, published 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 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.

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: Particular requirements for commercial electric forced convection ovens, steam cookers and steam-convection 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 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** 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 committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may 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.

The following differences exist in the countries indicated below.

- 6.1: Class 01 appliances are allowed (Japan).
- 13.2: Leakage current limits are different (Japan).
- 16.2: Leakage current limits are different (Japan).

**IMPORTANT – The "colour inside" logo on the cover page of this document 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.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website:

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

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 publications, basic safety publications and ~~generic standards~~ group safety publications 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 that 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.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods for measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 2-42: Particular requirements for commercial electric forced convection ovens, steam cookers and steam-convection ovens

#### 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrically operated commercial **forced convection ovens, steam cookers, steam-convection ovens** and, exclusive of any other use, **steam generators**, ~~not intended for household and similar 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 in areas not open to the public, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries and butcheries.

This standard deals also with electrically operated commercial **forced convection ovens, steam cookers, steam-convection ovens** intended for use on board ships, for which **informative** Annex AA is applicable.

~~NOTE 101—These appliances are used for commercial processing of food, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries, butcheries, etc.~~

The electrical part of appliances making use of other forms of energy is also within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by these types of appliances.

~~NOTE 102—~~Attention is drawn to the fact that:

- for appliances intended to be used in vehicles or **on board ships** or aircrafts, additional requirements ~~may~~ **can** be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities;
- in many countries additional requirements are specified for pressure appliances.

~~NOTE 103—~~This standard does not apply to:

- appliances designed exclusively for industrial purposes;
- 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);
- appliances for continuous mass production of food;
- microwave ovens (IEC 60335-2-90);
- **battery-operated appliances.**

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

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

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

IEC 60068-2-52:2017, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

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

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, *Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs with specified grade and property classes*

ISO 3506-2, *Fasteners – Mechanical properties of corrosion-resistant stainless steel fasteners – Part 2: Nuts with specified grade and property classes*

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 Definitions relating to physical characteristics

#### 3.1.4 Addition:

Note 101 to entry: The **rated power input** is the sum of the power inputs of all the individual elements in the appliance that can be on at one time; where there are several such combinations possible, that giving the highest power input is used in determining the **rated power input**.

#### 3.1.9 Replacement:

**normal operation**  
operation of the appliance under the ~~following~~ conditions specified in 3.1.9.101 to 3.1.9.103, as applicable.

Motors and **detachable electrical parts** incorporated in the appliance are operated under the most unfavourable conditions that can be expected in normal use taking into account the manufacturer's instructions.

**3.1.9.101** For dry heat mode, the appliance is operated with all the shelves or the shelf trolley in position according to the manufacturer's instructions but with no load. The controls are set so that the mean value of the temperature over the **thermostat** cycle at the geometric centre of each usable space in the interior of the oven is maintained at  $220\text{ °C} \pm 4\text{ °C}$ . Stepped controls are set so that this temperature is  $220\text{ °C} \pm 15\text{ °C}$ .

For ovens that are unable to attain a temperature of 220 °C, the controls are set at the maximum.

For ovens that are capable of attaining temperatures in excess of 270 °C, the controls are set so that the mean value of the temperature is 50 °C ± 4 °C below the maximum temperature attainable.

**3.1.9.102** For steaming only mode, the appliance is operated in accordance with the manufacturer's instructions with all controls intended to be operated by the user adjusted to their maximum setting until reaching operating temperature. They are then readjusted, if possible, to the lowest setting that maintains that temperature.

Appliances with **steam generators** intended to be filled by hand or by a manually operated tap are filled to the **indicated level** on the **steam generator**.

Appliances with **steam generators** intended to be filled automatically are connected to a water supply having the **maximum** pressure ~~designated~~ **indicated** by the manufacturer. Where the manufacturer specifies a range of pressures, the pressure is adjusted to give the most unfavourable conditions.

The incoming water is maintained at:

- 15 °C ± 5 °C in the case of appliances intended for connection to a cold water supply;
- 60 °C ± 5 °C or the temperature indicated in the instruction sheet, whichever is the higher, in the case of appliances intended for connection to a hot water supply only.

**NOTE 101** If the appliance is intended for connection to either a hot or cold water supply, the temperature of the water is that which gives the most unfavourable results.

Lids, doors, and covers are in position and closed.

The **cooking compartment** of the appliance contains a water load, initially at 15 °C ± 5 °C, comprising 0,5 l/kg of the manufacturer's declared maximum food load. The water load is evenly distributed between the shelves or pans.

**NOTE 102** Since pans may be perforated to allow for circulation of steam, the water load may be contained in suitable containers evenly distributed over the shelves or pans.

**3.1.9.103** For combination mode, the appliance is operated as for the steaming only mode, but with the forced convection fan/s and elements for heating the **cooking compartment** on and the temperature controls set as for the dry heat mode.

~~In all the above cases, motors incorporated in the appliance are operated in the intended manner under the most severe conditions that can be expected in normal use, taking into account the manufacturer's instructions.~~

### **3.1.101** **rated pressure**

maximum working pressure of **steam cookers** and **steam generators** assigned by the manufacturer to the pressurized parts of the appliance

## **3.5 Definitions relating to types of appliances**

### **3.5.101**

#### **forced convection oven**

appliance intended for the cooking of food by heated air that is circulated by mechanical means within the **cooking compartment**

**Note 1 to entry:** The pressure within the **cooking compartment** does not differ significantly from atmospheric pressure.

### 3.5.102

#### **steam cooker**

appliance intended for the cooking of food only by means of direct steam contact

**Note 1 to entry:** The pressure within the **cooking compartment** can exceed atmospheric pressure.

### 3.5.103

#### **atmospheric steam cooker**

appliance in which the pressure within the **cooking compartment** does not differ significantly from atmospheric pressure

### 3.5.104

#### **steam-convection oven**

appliance intended for the cooking of food either by means of direct steam contact or by heated air circulated by mechanical means within the **cooking compartment** or by a combination of these two modes

**Note 1 to entry:** The pressure within the **cooking compartment** does not differ significantly from atmospheric pressure.

### ~~3.105~~

#### ~~rated pressure~~

~~the maximum working pressure of steam cookers and steam generators assigned by the manufacturer to the pressurized parts of the appliance~~

## 3.6 Definitions relating to parts of an appliance

### ~~3.106~~6.101

#### **steam generator**

that part of the appliance designed specifically for the generation of steam for exclusive use in a cooking compartment

**Note 1 to entry:** The steam generator may be either combined within the cooking compartment, remote from the cooking compartment, but contained within the same casing, or function as a separate unit providing steam for one or more cooking compartments.

### ~~3.107~~6.102

#### **cooking compartment**

that part of the appliance in which the cooking or food heating process takes place

### ~~3.110~~6.103

#### **functional surface**

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

**Note 1 to entry:** An example is the heated sheath of a tubular heating element.

### ~~3.111~~6.104

#### **adjacent surface**

surface **that is** adjacent to a **functional surface** and which can become hot through conduction

## 3.8 Definitions relating to miscellaneous matters

### ~~3.108~~8.101

#### **indicated level**

mark on the appliance or **steam generator** to indicate the maximum liquid level for correct operation

### ~~3.109~~ 8.102

#### **installation wall**

special fixed construction containing supply facilities for appliances installed in conjunction with it

## **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.

### **5.10 Addition:**

*Appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall** are enclosed to obtain protection against electric shock and harmful ingress of water equivalent to that obtained when installed in accordance with the instructions provided with the appliance.*

NOTE ~~401~~ Appropriate enclosures or additional appliances ~~may~~ can be needed for test purposes.

**5.101** ~~Appliances are tested as heating appliances, even if they incorporate a motor.~~  
*Appliances are tested as **heating appliances**, when during a mode of operation electrical heaters are energized. If no electrical heaters are energized, the appliances are tested as **motor-operated appliances**.*

**5.102** *Appliances, when assembled in combination with or incorporating other appliances, are tested in accordance with the requirements of this standard. The other appliances are operated simultaneously in accordance with the requirements of the relevant standards.*

## **6 Classification**

This clause of Part 1 is applicable except as follows.

### **6.1 Replacement:**

Appliances shall be **class I** with respect to protection against electric shock.

*Compliance is checked by inspection and by the relevant tests.*

### **6.2 Addition:**

Appliances normally used on a table shall be at least IPX3. Other appliances shall be at least IPX4.

## **7 Marking and instructions**

This clause of Part 1 is applicable except as follows.

### **7.1 Addition:**

Appliances shall be marked with the **rated pressure**, in kilopascals (kPa), on pressurized parts of the appliance.

Unless the instructions include the statement to install the appliance and shelf trolley less than 1,6 m above the floor, the appliance and shelf trolley shall be marked with the risk of scalding symbol on the front surface.

If appliances have external **accessible surfaces**, for which temperature rise limits are specified in Table 101 and for which the provisions of footnote b to Table 101 apply, then the appliance shall be marked with symbol IEC 60417-5041 (2002-10), or with the substance of the following:

Caution: Hot surfaces.

#### 7.6 Addition:



[symbol IEC 60417-5041 (2002-10)]

caution, hot surface



risk of scalding

NOTE 101 The "Risk of scalding" symbol incorporates symbol IEC 60417-6418 (2020-06) combined with the warning sign of ISO 3864-1.

#### 7.12 Addition:

The instructions of **steam cookers** and **steam-convection ovens** shall also include information with regard to the maximum food load in kilograms (kg).

The instructions of **steam cookers** shall include the substance of the following warning:

**WARNING:** Do not open drain cocks or other emptying devices until the pressure has been reduced to approximately atmospheric pressure.

Instructions for **user maintenance**, for example cleaning, shall also be given. They shall include a statement that the appliance is not to be cleaned with a water jet or a steam cleaner.

If any of symbols IEC 60417-5021 (2002-10) ~~and~~ or IEC 60417-5041 (2002-10) or the risk of scalding symbol are marked on the appliance, ~~their~~ its meaning shall be explained.

~~The appliance and trolley shall be clearly visible and permanently marked with the warning sign shown in Figure 102 at a height of 1,60 m above the floor, if required.~~

~~NOTE The warning sign at the trolley can be etched or stamped and the size can be reduced.~~

~~If the appliance is not marked, the required warning sign shall be a part of delivery and the instructions shall point out that this marking has to be mounted after installation at a height of 1,60 m above the floor.~~

If the risk of scalding symbol is required to be marked in 7.1, but the appliance is not marked, the label with the symbol shall be supplied with the appliance and the instructions shall state that the label shall be affixed on the front surface after the installation at a height of 1,6 m or higher above the floor.

The instructions shall include the substance of the following warning:

**WARNING:** To avoid scalding, do not use loaded containers with liquids or cooking goods ~~which becomes fluid by heating in higher levels than those which can be safely~~

~~observed~~ that become fluid by heating in shelves positioned at levels higher than 1,6 m above the floor.

The instructions of **steam cookers** and **steam-convection ovens** shall include the substance of the following warning:

WARNING: When opening the door of the cooking compartment, hot steam can come out.

The instructions shall include the substance of the following:

These appliances are intended to be used for commercial applications, for example in kitchens of restaurants, canteens, hospitals and in commercial enterprises such as bakeries, butcheries, etc., but not for continuous mass production of food.

If the manufacturer wants to limit the use of the appliance to less than the above, this ~~has to~~ shall be clearly stated in the instructions.

If the shelves support have a “L-shape”, the instructions shall inform the user on the fact that these shelves are not suitable for the use with containers with liquids or for cooking processes which can generate liquids.

#### *Modification:*

The instruction concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance is not applicable.

#### **7.12.1** *~~Replacement~~ Addition:*

The appliance shall be accompanied by instructions detailing any special precautions necessary for installation. For appliances intended for installation in a bank of other appliances and appliances intended to be fixed to an **installation wall**, details of how to ensure appropriate protection against electric shock and harmful ingress of water shall be supplied. If the controls of more than one appliance are combined in a separate enclosure, detailed installation instructions shall be supplied. ~~Instructions for user maintenance, for example cleaning, shall also be given. They shall include a statement that the appliance is not to be cleaned with a water jet or a steam cleaner.~~

For appliances that are permanently connected to fixed wiring and for which leakage currents ~~may~~ can exceed 10 mA, particularly if disconnected or not used for long periods, or during initial installation, the instructions shall give recommendations regarding the rating of **protective devices**, such as ~~earth leakage relays~~ residual current devices (RCD), to be installed.

*Compliance is checked by inspection.*

#### **7.12.4** *Addition:*

The instructions for **built-in appliances** having a separate control panel for several appliances shall state that the control panel is only to be connected to the specified appliances in order to avoid a possible hazard.

#### **7.12.9** Not applicable.

#### **7.14** *Addition:*

The height of the triangle ~~used with~~ in symbol IEC 60417-5041 (2002-10) shall be at least 15 mm.

The height of risk of scalding symbol shall be at least 30 mm.

NOTE 101 The risk of scalding symbol at the trolley can be etched or stamped; in this case the size can be reduced.

#### 7.15 Addition:

The marking specified for external **accessible 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 **functional surface** or **adjacent surface**.

#### Modification:

For **fixed appliances**, the marking of the name or trademark or identification mark of the manufacturer or responsible vendor and the model or type reference shall be marked on the appliance and, if not visible when the appliance is installed as in normal use, shall be included in the instructions or on an additional label that can be fixed near the appliance after installation.

NOTE 101 ~~An example of such a fixed appliance is a built-in appliance.~~

**7.101** Appliances and **steam generators** intended to be filled by hand or by a manually operated tap shall be marked with an **indicated level**.

*Compliance is checked by inspection.*

**7.102** Equipotential bonding terminals shall be marked with symbol ~~5021 of IEC 60417-1~~ IEC 60417-5021 (2002-10).

These markings shall not be placed on screws, removable washers or other parts that can be removed when conductors are being connected.

*Compliance is checked by inspection.*

## 8 Protection against access to live parts

This clause of Part 1 is applicable.

## 9 Starting of motor-operated appliances

This clause of Part 1 is applicable except as follows.

**9.101** Fan motors providing a cooling effect in order to comply with the requirements of Clause 11 shall start under all voltage conditions that ~~may~~ can occur in use. The requirement is not applicable to the fan motor of a convection fan.

~~Compliance is checked by starting the motor three times at a voltage equal to 0,85 times rated voltage, the motor being at room temperature at the beginning of the test.~~

~~The motor is started each time under the conditions occurring at the beginning of normal operation or, for automatic appliances, at the beginning of the normal cycle of operation, the motor being allowed to come to rest between successive starts.~~

*Compliance is checked by the following tests using a supply source such that its drop in voltage does not exceed 1 % during the tests. The appliance being returned to **room temperature** after each test.*

*The appliance is started under the conditions occurring at the beginning of **normal operation** or, for automatic appliances, at the beginning of the normal cycle of operation, a voltage equal to 0,85 times **rated voltage** being applied to the input terminals of the appliance.*

*For appliances provided with motors having other than centrifugal starting switches, this test is repeated at a voltage equal to 1,06 times **rated voltage** being applied to the input terminals of the appliance.*

*The tests are carried out three times.*

*In all cases, the motor shall start and it shall function in such a way that safety is not affected and overload-~~protection~~ **protective devices** of the motor shall not operate.*

~~NOTE 1—The supply source must be such that during the test the drop in voltage does not exceed 1 %.~~

~~NOTE 2—A fan motor for the convection fan only is not considered to provide a cooling effect.~~

## 10 Power input and current

This clause of Part 1 is applicable except as follows.

### 10.1 Addition:

~~NOTE 101—~~For appliances having more than one heating unit, the total power input may be determined by measuring the power input of each heating unit separately (see also 3.1.4).

## 11 Heating

This clause of Part 1 is applicable except as follows.

### 11.2 Addition:

*Appliances intended to be fixed to the floor and appliances with a mass greater than 40 kg and not provided with rollers, castors or similar means are installed in accordance with the manufacturer's instructions. If no instructions are given, these appliances are considered as appliances normally placed on the floor.*

*Separate **cooking compartments** and **steam generators** are assembled in accordance with the manufacturer's instructions and located in the test corner in such a manner that they will have the most unfavourable effect on each other and on their surroundings.*

### 11.3 Addition:

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of ~~Figure 104~~ **Figure 101** is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. 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 may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.*

### 11.4 Replacement:

*Appliances are operated under **normal operation** such that the total power input of the appliance is 1,15 times **rated power input**. If it is not possible to switch on all heating elements*

*at the same time, the test is made with each of the combinations that the switch arrangement will allow, the highest load possible with each switching arrangement being in circuit.*

*If the appliance is provided with a control that limits the total power input, the test is made with whichever combination of heating units, as may be selected by the control, imposes the most ~~severe~~ unfavourable condition.*

*If the temperature rise limits of motors, transformers or **electronic circuits** are exceeded, the test is repeated with the appliance supplied at 1,06 times **rated voltage**. In this case, only the temperature ~~rises of motors, transformers or electronic circuits~~ rise of the components for which the temperature rise limits were exceeded are measured.*

#### **11.7 Replacement:**

*The appliance is operated as follows.*

*Appliances with **steam generators** incorporated in the **cooking compartment** are operated on continuous cycles until steady conditions are established. Each cycle comprises an operating period followed by a rest period strictly sufficient, but in no case longer than 5 min, to allow for replacing the water load, the water level in the **steam generators** intended to be filled by hand being, if necessary, restored to the **indicated level**, in accordance with the manufacturer's instructions.*

*The operating period is equal to the maximum cooking time declared by the manufacturer or, if such declaration is not provided, to the time taken for the appliance to reach the maximum temperature conditions.*

*Appliances with separate **steam generators** are switched on and allowed to operate until steady conditions are established in the **steam generator**. When these conditions have been reached, the appliance is operated as above.*

*Other appliances are operated until steady conditions are established.*

~~NOTE 101—The duration of the test may consist of more than one cycle of operation.~~

*Steady conditions are considered to exist 60 min after reaching the temperatures defined for **normal operation**.*

*When an appliance is assembled in combination with, equipped with or incorporating accessories or other appliances, the interaction shall be covered if they are provided to operate simultaneously as stated by the manufacturer or by a common control.*

#### **11.8 Modification:**

*During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.*

*Addition:*

*During the test, the pressure relief device shall not operate.*

**Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions**

| Surface <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Temperature rise of external accessible surfaces <sup>b</sup><br>K |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Bare metal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 48                                                                 |
| Coated metal <sup>c</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 59                                                                 |
| Glass and ceramic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 65                                                                 |
| Plastic and plastic coating > 0,4 mm <sup>d, e</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 74                                                                 |
| <p><sup>a</sup> Temperature rises are not measured on:</p> <ul style="list-style-type: none"> <li>– the underside of appliances intended to be used on a working surface or floor;</li> <li>– the rear surface of appliances;</li> <li>– surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end;</li> <li>– the area around a heated cavity door opening as shown in <del>Figure 105</del> Figure 102;</li> <li>– <b>functional surfaces and adjacent surfaces.</b></li> </ul> <p><sup>b</sup> The temperature rise on external accessible surfaces up to a distance of 100 mm from <b>adjacent surfaces</b> of the appliance (see Figure 103) may exceed the limits by up to 25 K, but the relevant part shall then be marked with symbol IEC 60417-5041 (2002-10) or the equivalent text.</p> <p><sup>c</sup> Metal is considered coated when a coating having a minimum thickness of 90 µm made <del>by</del> of enamel or non-substantially plastic coating is used.</p> <p><sup>d</sup> The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.</p> <p><sup>e</sup> When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.</p> |                                                                    |

## 12 ~~Void~~ Charging of metal-ion batteries

This clause of Part 1 is not applicable.

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

### 13.2 Modification:

Instead of the permissible leakage current for **stationary class I appliances**, the following applies:

- for cord and plug connected appliances 0,75 mA or 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA, whichever is higher;
- for other appliances 0,75 mA or 1 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.

For **portable class I appliances**, instead of the permissible leakage current, the following applies:

- for cord and plug connected appliances 0,75 mA or 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA, whichever is higher.

## 14 Transient overvoltages

This clause of Part 1 is applicable.

## 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

### 15.1.1 Addition:

*In addition, ~~IPX0, IPX1, IPX2, IPX3 and IPX4~~ appliances, except those marked IPX5 and IPX6, are subjected for 5 min to the following splash test.*

*The apparatus shown in ~~Figure 101~~ Figure 104 is used. The appliance is placed in normal position of use and adjustable feet shall be set in accordance with the instructions for use to the most unfavourable height.*

*For appliances normally used on the floor, the bowl is placed on the floor and is moved around in such a way as to splash the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 150 mm above the bottom of the bowl. The bowl is ~~placed on the floor for appliances normally used on the floor~~ not positioned underneath the appliance. ~~For all other appliances on a horizontal support 50 mm below the lowest edge of the appliance, the bowl is so moved around as to splash the appliance from all directions.~~*

*For all other appliances, the bowl is placed on the same plane where the appliance is placed and is moved around in such a way as to splash the appliance from all directions. During the test, the water pressure is so regulated that the water splashes up 100 mm above the bottom of the bowl. The bowl is not positioned underneath the appliance.*

*Care is taken that the appliance is not hit by the direct jet.*

### 15.1.2 Modification:

*Appliances normally used on a table are placed on a support having dimensions that are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the support.*

### 15.2 ~~Replacement:~~

~~Appliances shall be constructed so that spillage of liquid in normal use does not affect their electrical insulation.~~

~~Compliance is checked by the following test using a spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent.~~

~~Any commercially available non-ionic rinsing agent may be used, but if there is any doubt with regards to the test results, the rinsing agent shall have the following properties:~~

- ~~– viscosity            17 mPa·s~~
- ~~– pH                    2,2 (1 % in water).~~

~~and its composition shall be:~~

| Substance                        | Parts by mass<br>% |
|----------------------------------|--------------------|
| Plurafac® LF 221 <sup>1</sup>    | 15,0               |
| Cumene sulfonate (40 % solution) | 11,5               |
| Citric acid (anhydrous)          | 3,0                |
| Deionized water                  | 70,5               |

~~Appliances with type X attachment, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cable or cord of the smallest cross-sectional area specified in 26.6 and other appliances are tested as delivered.~~

~~Detachable parts are removed.~~

Modification:

**A** One litre of the spillage solution is poured steadily over a period of 1 min over the bottom surface of the **cooking compartment**.

The water containers of appliances intended to be filled with water by hand are completely filled with the spillage solution and a further quantity equal to 15 % of the capacity of the container is poured in steadily over a period of 1 min.

Appliances with containers intended to be filled by a manually operated tap or automatically are connected to a water supply having the maximum supply pressure indicated by the manufacturer. The means for controlling the incoming water is held fully open and the filling continued for 1 min after the first evidence of overflow, or until a further protective system operates to stop the inflow.

In addition, **forced convection ovens** with automatic fillers or spraying systems and intended for permanent connection to the water mains, are operated for 5 min with any means that limit the water intake, for example a water level device, flow control, etc., rendered inoperative in the most unfavourable conditions. The fan motor is operated, if it can be operated independently, with the heating elements on or not, whichever is the most ~~severe~~ unfavourable condition.

During this test the appliance is connected to a water supply having the maximum pressure indicated by the manufacturer.

If more than one controlling device is fitted, the test is repeated with each device rendered inoperative in turn.

~~The appliance shall withstand an electric strength test as specified in 16.3 and inspection shall show that water that may have entered the appliance does not impair compliance with this part: in particular, there shall be no trace of water on insulation for which clearances and creepage distances are specified in Clause 29.~~

**15.101** Appliances that are provided with a tap intended for filling or cleaning shall be constructed so that the water from the tap cannot come into contact with **live parts**.

Compliance is checked by the following test.

<sup>1</sup>—Plurafac® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product.

The tap is fully opened for 1 min with the appliance connected to a water supply having the maximum water pressure indicated by the manufacturer. Tilttable and movable parts, including lids, are tilted or placed in the most unfavourable position~~s~~. Swivelling outlets of water taps are so positioned as to direct water on to those parts that will give the most unfavourable result. Immediately following this treatment, the appliance shall withstand an electric strength test as specified in 16.3.

## 16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

### 16.2 Modification:

Instead of the permissible leakage current for **stationary class I appliances**, the following applies:

- for cord and plug connected appliances 0,75 mA or 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA, whichever is higher;
- for other appliances 0,75 mA or 1 mA per kW **rated power input** of the appliance with no maximum, whichever is higher.

For **portable class I appliances**, instead of the permissible leakage current, the following applies:

- for cord and plug connected appliances 0,75 mA or 1 mA per kW **rated power input** of the appliance with a maximum of 10 mA, whichever is higher.

## 17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

## 18 Endurance

This clause of Part 1 is applicable.

## 19 Abnormal operation

This clause of Part 1 is applicable except as follows.

### 19.1 Addition:

*Compliance is also checked by the test of 19.101.*

A control or switching device that is intended for different settings corresponding to different functions of the same part of the appliance ~~and that are covered by different standards~~ is in addition set in the most ~~severe~~ unfavourable setting irrespective of the manufacturer's instructions.

~~Appliances provided with a control limiting the pressure during the tests of Clause 11 are also subjected to the tests of 19.4 with this control rendered inoperative.~~

NOTE 101—Continuous blowing-off of the pressure relief device is in itself disregarded.

**19.2** Modification:

~~Instead of the first sentence, the following applies.~~

The supply voltage, determined prior to the test, is that required to provide a power input of 0,85 times **rated power input** under **normal operation** when the power input has stabilized. This voltage is maintained throughout the test.

Restricted heat dissipation is obtained as follows.

Dry heat mode:

Appliances are tested under the conditions specified in Clause 11, but with the fan motor rendered inoperative.

**NOTE 101**—If there is more than one fan motor, they are rendered inoperative in turn.

Steaming only and combination modes:

Appliances are tested under the conditions specified in Clause 11, but without water load and with all doors or lids closed. **Steam generators** intended to be filled by hand are operated without water. **Steam generators** intended to be filled by a manually operated tap or automatically are operated with the water supply turned off and the **steam generator** dry.

**19.34** Addition:

Any adjustable temperature or pressure control within the appliance that is pre-set for correct operation but is not locked in position is adjusted to its most unfavourable position.

**19.7** Modification:

Instead of the text preceding the table, the following applies.

Moving parts of motor and fan assemblies are locked and the appliance is operated, starting from ~~cold~~ **room temperature**, under **normal operation**, at **rated voltage** or at the upper limit of the **rated voltage range**, as long as is necessary to establish steady conditions or, if a timer is provided, for the maximum period allowed by the timer.

**NOTE 101**—If an appliance has more than one motor, the test is ~~made~~ **carried out** for each motor separately.

**NOTE 102**—Alternative tests for protected motor units are given in **normative** Annex D.

Appliances incorporating motors **and** having capacitors in the circuit of an auxiliary winding, are operated with the rotor locked, the capacitors being open-circuited one at a time. The test is repeated with the capacitors short-circuited one at a time, unless they ~~comply with~~ **are of class S2 or S3 of IEC 60252-1:2010 including IEC 60252-1:2010/AMD1:2013.**

**NOTE 103**—This test is made with the rotor locked because certain motors with capacitors may or may not start so that variable results could be obtained.

~~During the test, the temperature of the windings shall not exceed the values shown in Table 8.~~

**NOTE 101** This test is carried out with the rotor locked since some motors can start thus giving rise to inconsistent results.

~~**19.8**~~ Addition:

~~Compliance is checked as for 19.7.~~

**19.13 Addition:**

*During the test, the temperature of the windings shall not exceed the values shown in Table 8.*

**19.101** *Appliances provided with a control limiting the pressure during the tests of Clause 11 are also subjected to the tests of 19.4 with this control rendered inoperative.*

*During this test, the pressure relief device is allowed to operate.*

**20 Stability and mechanical hazards**

This clause of Part 1 is applicable except as follows.

**20.1 Modification**

*The test on appliances with heating elements with the angle of inclination increased to 15 ° is not applied and the temperature rises values shown in Table 9 are not applicable.*

*Addition:*

*Covers, lids and accessories are placed in the most unfavourable positions.*

~~*Shelf trolleys are subjected to the following additional test.*~~

~~*The trolley, loaded in accordance with the manufacturer's instructions, is placed on a plane that is inclined at 10° to the horizontal. The braking mechanism is applied and the trolley shall not move by more than 100 mm.*~~

~~NOTE 101—Any spillage of liquid is ignored.~~

~~**20.2 Addition:**~~

~~Add the following after the first requirement paragraph.~~

~~This applies also to operating means, i.e. handles or wheels.~~

~~*Addition:*~~

~~*The requirement concerning moving parts of the appliance does not apply to parts necessary to implement the tilting operation such as handles or wheels.*~~

~~*Compliance is checked by test probe 41 of IEC 61032 applied with a force of 10 N.*~~

**20.101** Appliances other than appliances intended to be fixed to the floor shall have adequate stability when the doors are open and subjected to a load.

*Compliance is checked by the following tests.*

*Doors having a horizontal hinge at their lower edge are opened and a weight is gently placed on the surface of the door so that its centre of gravity is vertically over the geometric centre of the door. The contact area of the weight is such as will cause no damage to the door, and its mass is:*

- *for appliances normally used on a floor:*

- for **cooking compartment** doors: 23 kg or such higher value as, according to the manufacturer's cooking instructions, can be placed in the **cooking compartment**;
- for other doors: 7 kg;
- for appliances normally used on a table or similar support and provided with doors having a horizontal hinge at their lower edge and a projection of at least 225 mm from the hinge to the opening edge:
  - 7 kg or such higher value as, according to the manufacturer's cooking instructions, can be placed in the **cooking compartment**.

Doors, except those where the lower level of the cooking compartment is above a normal working surface, having a vertical hinge are opened through an angle of 90°, and a downward force of 140 N is then applied gently to the top of the door at the extremity furthest from the hinge.

For non-rectangular doors, the force is applied to that point furthest from the hinge where such a force might be exerted in normal use.

NOTE For the weight, a sandbag ~~may~~ can be used.

This test is repeated with the door opened as far as possible, but not through an angle of more than 180°.

For appliances provided with more than one door, the tests are made on each door separately.

During these tests, the appliance shall not tilt.

Damage and deformation of doors and hinges are neglected.

**20.102** Guards fitted over motors and fan assemblies in order to comply with the requirements of 20.2 shall not be **detachable parts**, unless:

- a suitable interlock assembly is fitted that prevents the motor or fan from operating when the guard is removed, or
- the guard forms an integral part of the oven lining.

Compliance is checked by inspection and manual test.

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

**21.101** ~~Shelves shall be constructed so that they do not fall away from the shelf supports either when inside the **cooking compartment** or extended out by 50 % of their depth. They shall not tip when extended out by 50 %.~~

Shelves shall be constructed so that they do not:

- drop from their supports under load;
- fall away from the shelf supports when extended out by 50 % of their depth;
- tip when extended out by 50 % of their depth from their supports.

Grids, trays, containers and the like are considered as shelves.

The requirement does not apply for shelves if their supports are L-shaped.

Compliance is checked by the following test.

~~Load a cake tin or similar container, having an area of 75 % of that of the shelf, with evenly distributed weights of mass totalling 40 kg for each square metre of tin area. Insert a shelf, with the loaded tin centrally disposed, on the supports provided in the cooking compartment.~~

Load a shelf evenly with a mass of 40 kg/m<sup>2</sup>. Insert the shelf with the load centrally on the supports provided in the oven.

Move the shelf as far as possible to the left, leave it for 1 min and then withdraw it. Re-insert the shelf and move it to the extreme right, leave it for 1 min and again withdraw it. During ~~this~~ the test the shelf shall not fall away from the support.

The test is then repeated with the shelf extended out by 50 % of its depth. The shelf shall not fall away from its support.

~~Then apply an additional force of 10 N vertically downward on the centre of the exposed front edge of the shelf. During this test the shelf shall not tip.~~

NOTE—A small angle of deflection is allowed.

Then, with the exception of devices which provide L-shaped supports, an additionally force of 10 N is applied vertically downwards on the centre of the exposed front edge of the shelf. During this test, the shelf shall not tip by more than 10° to the horizontal.

## 22 Construction

This clause of Part 1 is applicable except as follows.

### 22.7 Replacement:

**Steam cookers** and **steam generators** that operate at a pressure in excess of atmospheric pressure (over-pressure) shall incorporate a suitable pressure relief device that prevents excessive pressure.

Compliance is checked by operating the appliance at **rated power** input with the pressure controls rendered inoperative.

The pressure relief device shall operate during this test so as to prevent the internal pressure exceeding the **rated pressure** by *more than 20 %*.

**22.101** For ~~three~~ multi-phase appliances, **thermal cut-outs** protecting circuits with heating elements, and those for motors of which the unexpected starting ~~may~~ can cause a hazard, shall be of the non-self-resetting and trip-free type, and shall provide **all-pole disconnection** from related supply circuits.

For single-phase appliances and for single-phase heating elements and/or motors connected between one phase and neutral or between phase and phase, **thermal cut-outs** protecting circuits with heating elements, and those for motors of which the unexpected starting ~~may~~ can cause a hazard, shall be of the non-self-resetting and trip-free type, and shall provide at least one-pole disconnection.

If the **non-self-resetting thermal cut-out** is only accessible after removing parts with the aid of a **tool**, the trip-free type is not required.

NOTE—~~1 Thermal cut-outs of the Trip-free type have an automatic action, with a reset actuating member, so constructed that the automatic action is independent of manipulation or position of the reset mechanism.~~ Trip-free is an automatic action that is independent of manipulation or position of the actuating member.

**Thermal cut-outs** of the bulb and capillary type that operate during the tests of Clause 19 shall be such that rupture of the capillary tube shall not impair compliance with the requirements of 19.13.

*Compliance is checked by inspection and by manual test and by rupturing the capillary tube in such a way that the rupture does not seal the tube.*

~~NOTE 2—Care must be taken to ensure that the rupture does not seal the capillary tube.~~

**22.102** Lights, switches or push-buttons for the indication of danger, alarm or similar situations shall be coloured red.

*Compliance is checked by inspection.*

**22.103** The operating pressure of **steam cookers** and **steam generators** shall not exceed the **rated pressure**.

*Compliance is checked during the test of Clause 11.*

**22.104** It shall not be possible to open the **cooking compartment** door of a pressurized appliance until the pressure has been reduced to approximately atmospheric pressure.

*Compliance is checked by inspection and by manual test.*

**22.105** For appliances designed to operate at atmospheric pressure, the steam vents shall be protected either by design, location, or other means against blockage.

*Compliance is checked by inspection.*

**22.106** Appliances intended to be connected to the water mains shall have means for safe collection and/or drainage of water. The level to which manually filled water containers have to be filled shall be so located as to be readily visible when filling and that no other hazardous situation for the user could occur.

*Compliance is checked by inspection and by manual test.*

**22.107** The level to which manually filled water containers have to be filled shall be so located as to be readily visible when filling.

*Compliance is checked by inspection.*

**22.108** Appliances shall be provided with a means whereby exhausted steam is condensed automatically before it is released to the drain.

*Compliance is checked by inspection.*

**22.109** Pressurized appliances shall incorporate a vacuum release valve to prevent a partial vacuum forming unless it is designed for vacuum operation.

*Compliance is checked by inspection.*

**22.110** Pressurized **parts** of appliances shall be capable of withstanding the **rated pressure**.

*Compliance is checked by subjecting the pressurized parts for 30 min to a hydrostatic pressure equal to 1,5 times the **rated pressure**. All outlets are sealed and any pressure relief devices rendered inoperative. Means other than water may be used to create the hydrostatic pressure.*

*During the test, the pressurized parts shall show no signs of leaks or permanent deformation, nor shall they burst.*

**22.111** Interlock devices fitted on **cooking compartment** doors and guards in order to comply with the requirements of 20.2 and 20.101 shall be so arranged that:

- the fan motor is disconnected from the supply when the **cooking compartment** door is opened to give a gap not greater than 50 mm;
- it shall not be possible to override any interlock using test probe B of IEC 61032.

*Compliance is checked by inspection and by measurement, and by applying the test probe B with a force of 5 N in any position with the cooking compartment door open.*

**22.112 Portable appliances** shall not have openings on the underside that would allow small items to penetrate and touch **live parts**.

*Compliance is checked by inspection and by measuring the distance between the supporting surface and **live parts** through openings. This distance shall be at least 6 mm. However, if the appliance is fitted with legs, this distance is increased to 10 mm if the appliance is intended to stand on the table and to 20 mm if it is intended to stand on the floor.*

**22.113** The pressure relief device shall be positioned or constructed so that its operation does not cause injury to persons or damage to surroundings. Its construction shall be such that it cannot be made inoperative or set to a higher relief pressure without the aid of a special tool.

*Compliance is checked by inspection.*

#### **22.114** ~~Void~~

*Trolleys fitted with wheels or similar means shall be provided with an efficient means of locking while the trolley is stationary.*

*Compliance is checked by the following test.*

*The trolley, fully loaded in accordance with the manufacturer's instructions, is placed on a rigid plane coated with aluminium oxide paper (grain size 80) and inclined at 10° to the horizontal. The braking mechanism is applied and the trolley shall not move by more than 100 mm. Any spillage of liquid is ignored.*

**22.115** Drain cocks and other emptying devices for hot liquids shall be constructed so that they cannot be opened inadvertently.

This requirement is met if the emptying device handle is such that:

- when released, it returns the emptying device automatically to the closed position;
- it is of the wheel type; or
- it is placed in a recess such that it cannot be placed in the open position by means of test probe B of IEC 61032 using a single action with a force of 10 N.

Moreover, it shall not be possible to withdraw drain plugs inadvertently.

*Compliance is checked by inspection and by manual test.*

~~NOTE For example, this requirement is met when the valve handle is such that, when released, it returns automatically to the closed position or is of the wheel type or is placed in a recess.~~

**22.116** If the dimensions of a **cooking compartment** exceed 700 mm × 1 500 mm × 700 mm, it shall be possible to open the door of the compartment from the inside with a force not exceeding 70 N.

*Compliance is checked by inspection, by measurement of the dimensions after removal of detachable parts and by manual test.*

**22.117** Appliances provided with a means whereby condensate is automatically discharged shall be constructed so that the discharge does not result in a hazard.

*Compliance is checked by inspection.*

**22.118** For appliances with integrated cleaning systems, the cleaning process shall only be able to operate when the door is closed and interlocked to avoid significant ejection of hot water, steam or cleaning agents, unless there is adequate protection against ejection of hot water, steam or cleaning agents. Throughout the whole cleaning cycle, there shall be a clear indication that the cleaning process is running.

*Compliance is checked by the following test:*

*The appliance is operated under the conditions specified in Clause 11 but supplied at rated voltage. The door is opened during the cleaning process when hot water is sprayed into the cavity and it shall be verified that there is no significant ejection of hot water, steam or cleaning agents. Slight splashing or spraying of hot water, steam or cleaning agents, occurring after the door has been opened, is neglected.*

**22.119** Thermal controls shall not be incorporated in connectors.

*Compliance is checked by inspection.*

## 23 Internal wiring

This clause of Part 1 is applicable except as follows.

### 23.3 Addition:

~~When~~ If the capillary tube of the **thermostat** is liable to flexing in normal use the following applies:

- where the capillary tube is fitted as part of the internal wiring, Part 1 applies;
- where the capillary tube is separate, it is subjected to 1 000 flexings at a rate not exceeding 30 per minute.

~~NOTE 101—If, in any of the above cases, it is not possible to move the movable part of the appliance at the given rate, due for example to the mass of the part, the rate of flexing may be reduced.~~

*The rate of flexing may be reduced if it is not possible to move the movable part of the appliance at the given rate due to the mass of the movable part.*

*After the test, the capillary tube shall show no sign of damage within the meaning of this standard and no damage impairing its further use.*

*However, if a rupture of the capillary tube renders the appliance inoperative (fail-safe), separate capillary tubes are not tested, and those fitted as part of the internal wiring are not inspected for compliance with the requirements.*

*Compliance in this instance is checked by rupturing the capillary tube in such a way that the rupture does not seal the capillary tube.*

~~NOTE 102—Care must be taken to ensure that the rupture does not seal the capillary tube.~~

## 24 Components

This clause of Part 1 is applicable.

## 25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

### 25.1 Modification:

Appliances shall not be provided with an appliance inlet.

### 25.3 Addition:

Appliances with a mass greater than 40 kg, intended for permanent connection to fixed wiring and not provided with rollers, castors or similar means, shall be constructed so that the connection can be done after the appliance has been installed in accordance with the manufacturer's instructions.

The connection to the fixed wiring of **built-in appliances** may be made before the appliance is installed.

Terminals for permanent connection of cables to fixed wiring may also be suitable for the **type X attachment** of a **supply cord**. In this case, a cord anchorage complying with 25.16 shall be fitted to the appliance.

~~If the appliance is provided with a set of terminals allowing the connection of a flexible cord, they shall be suitable for the **type X attachment** of the cord.~~

~~In both cases the instructions shall give full particulars of the power **supply cord**.~~

~~The connection to the supply wires of **built-in appliances** may be made before the appliance is installed.~~

~~Compliance is checked by inspection.~~

If the appliance uses a **type X attachment** the instructions shall state the size and type of the **supply cord** to be used.

### 25.7 Modification:

*Instead of the types of **supply cords** specified, the following applies.*

**Supply cords** shall be oil-resistant, sheathed flexible cable not lighter than ordinary polychloroprene or other equivalent synthetic elastomer-sheathed cord (code designation 60245 IEC 57).

## 26 Terminals for external conductors

This clause of Part 1 is applicable.

## 27 Provision for earthing

This clause of Part 1 is applicable except as follows.

### 27.2 Addition:

**Stationary appliances** shall be provided with a terminal for the connection of an external equipotential conductor. This terminal shall:

- be in effective electrical contact with all fixed exposed metal parts of the appliance, *except small fixed exposed metal parts such as name-plates and similar parts*;
- allow the connection of a conductor having a nominal cross-sectional area of up to 10 mm<sup>2</sup>; *and*
- be located in a position convenient for the connection of the bonding conductor after installation of the appliance.

*NOTE 101—Small fixed exposed metal parts, for example nameplates and the like, are not required to be in electrical contact with the terminal.*

## 28 Screws and connections

This clause of Part 1 is applicable except as follows.

### 28.1 Addition:

Screws made of carbon steel and alloy steel shall be made in accordance with ISO 898-1.

Screws made of corrosion-resistant stainless-steel shall be made in accordance with ISO 3506-1, or ISO 3506-2, or ISO 3506-3, or ISO 3506-4.

### 28.4 Addition:

Screws that make mechanical connections and electrical connections shall be so designed that the contact pressure does not change appreciably through loosening of the screwed assembly parts during operational stress and contact corrosion.

Screws that make mechanical connections and provide earthing continuity shall be so designed that the contact pressure does not change appreciably through loosening of the screwed assembly parts due to operational stress and contact corrosion. They shall be designed so that a minimum contact pressure remains.

*Compliance is checked by inspection and by measuring the assembling torques for screwed connections providing earthing continuity by applying a torque as specified in Table 102 to turn the screw in the fastening direction. The screw shall not turn.*

*The screw shall not have been unfastened prior to performing this test.*

**Table 102 – Assembling torques for screwed connections providing earthing continuity**

| Outer thread diameter of the screw<br>mm | Assembling torque<br>Nm                                                                                                                                                       |                                                                                                  |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                                          | Screwed connections for the mechanical strength of the screws A2-70 in accordance with ISO 3506-1, or ISO 3506-2, or ISO 3506-3, or ISO 3506-4 and 5.8 according to ISO 898-1 | Screwed connections for the mechanical strength of the screws > 8.8 in accordance with ISO 898-1 |
| >2,8 and ≤ 3,6                           | 0,8                                                                                                                                                                           | 1,3                                                                                              |
| >3,6 and ≤ 4,2                           | 1,9                                                                                                                                                                           | 3,0                                                                                              |
| >4,2 and ≤ 5,3                           | 3,7                                                                                                                                                                           | 6,0                                                                                              |
| >5,3 and ≤ 6,3                           | 6,5                                                                                                                                                                           | 10,0                                                                                             |
| M 8                                      | 15,0                                                                                                                                                                          | 25,0                                                                                             |
| M 10                                     | 31,0                                                                                                                                                                          | 50,0                                                                                             |

## 29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

### 29.2 Addition:

The microenvironment is pollution degree 3 and the insulation shall have a comparative tracking index (CTI) not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

## 30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

### 30.2.1 Modification:

*The glow-wire test is carried out at 650 °C. The glow-wire flammability index (GWFI) according to IEC 60695-2-12 shall be at least 650 °C.*

### 30.2.2 Not applicable

**30.101** Filters, if any, of non-metallic materials intended for the absorption of grease are subjected to the burning test specified in ISO 9772 for category HBF material, if relevant, or shall be classified at least HB40 according to IEC 60695-11-10, except that the thickness of the specimen is the same as that in the appliance.

*Compliance is checked by the tests of ISO 9772 or IEC 60695-11-10.*

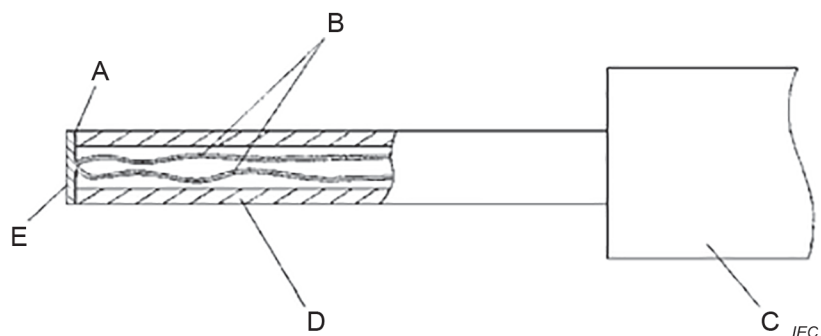
**NOTE**—*For the burning test specified in ISO 9772, it may be necessary to support the specimen.*

## 31 Resistance to rusting

This clause of Part 1 is applicable.

## 32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



### Key

- A adhesive
- B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K ~~(chrome alumel)~~
- C handle arrangement permitting a contact force of  $4\text{ N} \pm 1\text{ N}$
- D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm
- E tinned copper disc: 5 mm diameter, 0,5 mm thick with flat contact face

**Figure ~~104~~ 101 – Probe for measuring surface temperatures**



~~Minimum height: 30 mm~~

~~Form and colours in accordance with ISO 3864-1~~

**~~Figure 102 – Warning sign against danger of scalding~~**

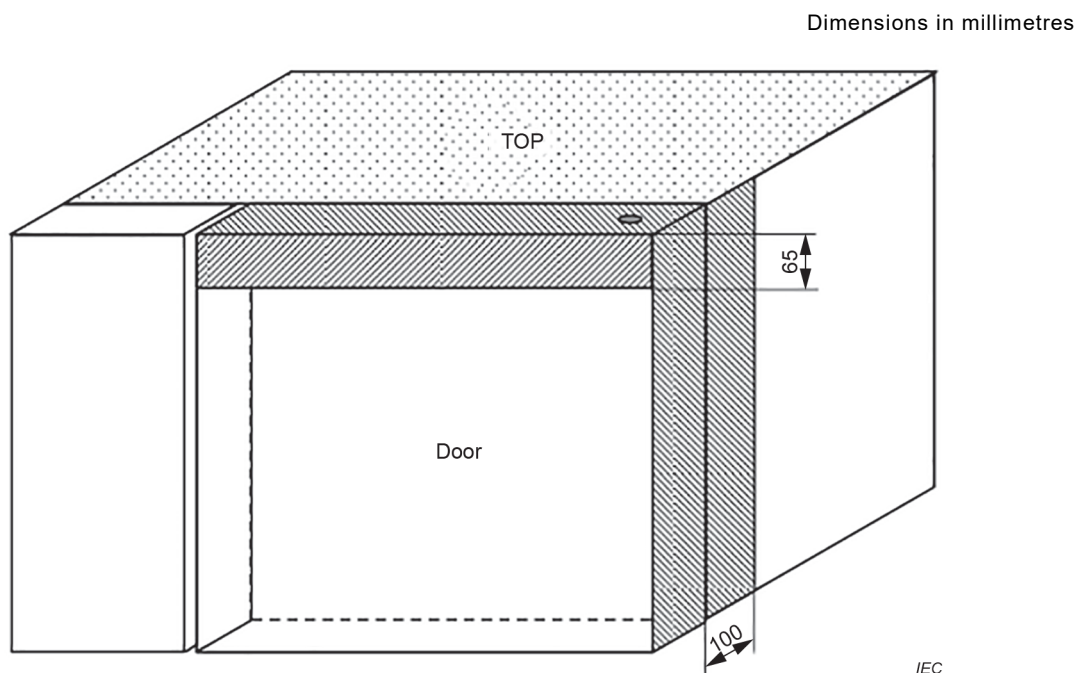
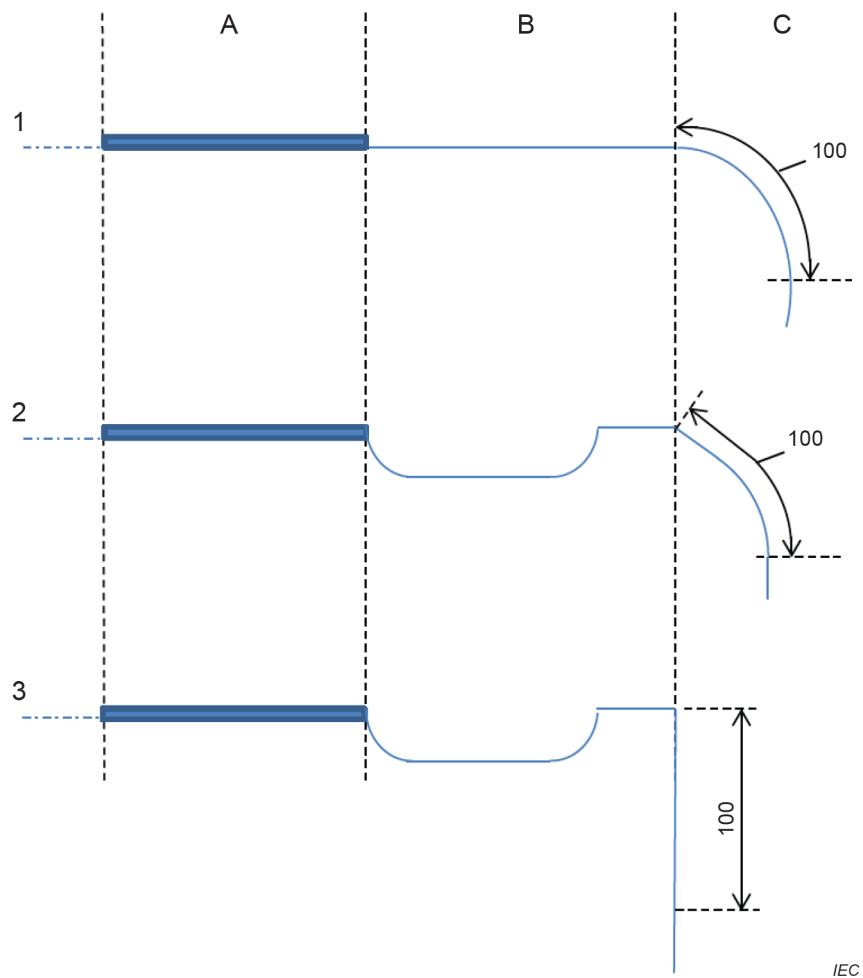


Figure ~~105~~ 102 – Adjacent surfaces which are not measured

Dimensions in millimetres



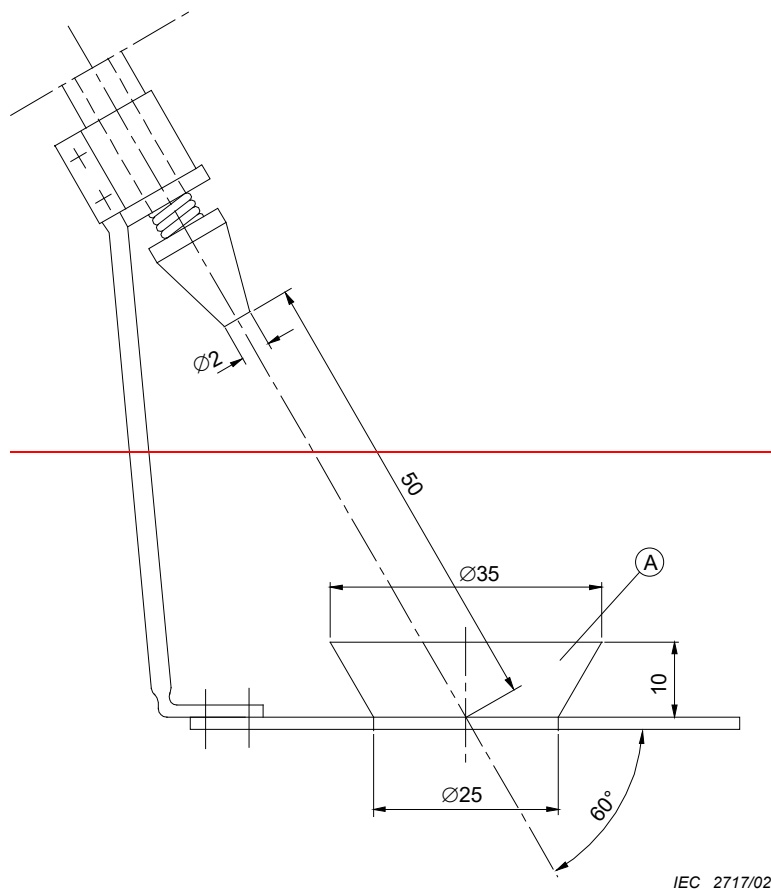
**Key**

A functional surface

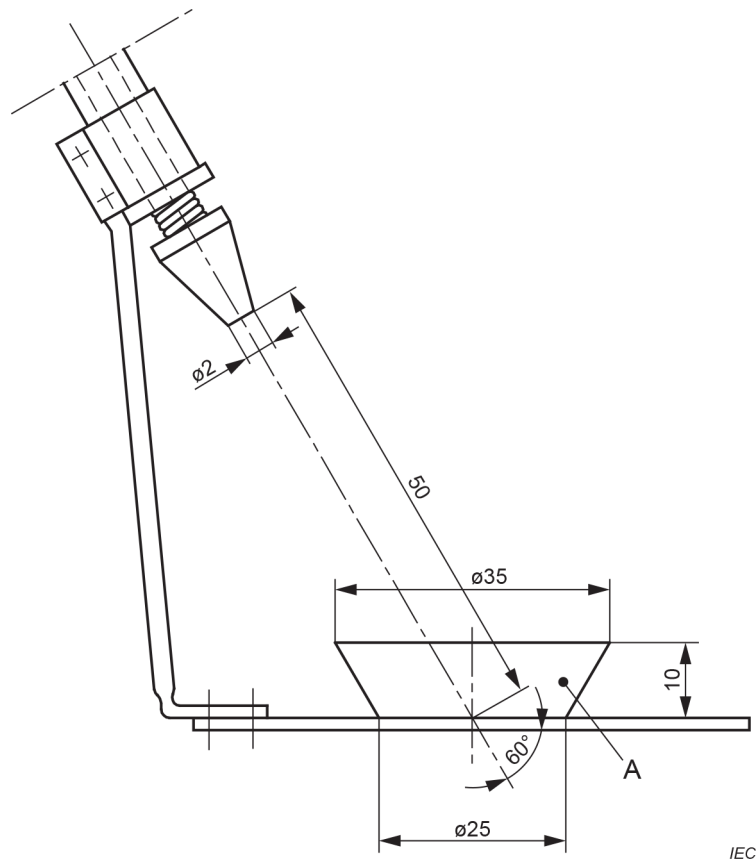
B adjacent surface

C external accessible surface

**Figure 103 – Identification of surfaces for temperature measurement**



Dimensions in millimetres



**Key**

A bowl

**Figure-101 104 – Splash apparatus**