

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –  
Part 2-15: Particular requirements for appliances for heating liquids**

**Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-15: Exigences particulières pour les appareils de chauffage des liquides**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2024 IEC, Geneva, Switzerland

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

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

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

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

### About the IEC

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

### About IEC publications

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

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

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 It also gives information on projects, replaced and withdrawn publications.

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

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

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

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

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

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

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

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

---

### A propos de l'IEC

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

### A propos des publications IEC

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

#### Recherche de publications IEC -

[webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

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

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

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

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

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

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

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

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

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60335-2-15

Edition 7.0 2024-11

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –  
Part 2-15: Particular requirements for appliances for heating liquids**

**Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-15: Exigences particulières pour les appareils de chauffage des liquides**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 13.120, 97.040.50

ISBN 978-2-8322-9905-0

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

## CONTENTS

|                                                                                                                                        |    |
|----------------------------------------------------------------------------------------------------------------------------------------|----|
| FOREWORD.....                                                                                                                          | 4  |
| INTRODUCTION.....                                                                                                                      | 7  |
| 1 Scope.....                                                                                                                           | 8  |
| 2 Normative references .....                                                                                                           | 9  |
| 3 Terms and definitions .....                                                                                                          | 10 |
| 4 General requirement.....                                                                                                             | 12 |
| 5 General conditions for the tests .....                                                                                               | 12 |
| 6 Classification .....                                                                                                                 | 12 |
| 7 Marking and instructions.....                                                                                                        | 13 |
| 8 Protection against access to live parts.....                                                                                         | 16 |
| 9 Starting of motor-operated appliances .....                                                                                          | 16 |
| 10 Power input and current.....                                                                                                        | 16 |
| 11 Heating.....                                                                                                                        | 16 |
| 12 Charging of metal-ion batteries .....                                                                                               | 19 |
| 13 Leakage current and electric strength at operating temperature.....                                                                 | 20 |
| 14 Transient overvoltages .....                                                                                                        | 20 |
| 15 Moisture resistance .....                                                                                                           | 20 |
| 16 Leakage current and electric strength .....                                                                                         | 23 |
| 17 Overload protection of transformers and associated circuits .....                                                                   | 23 |
| 18 Endurance .....                                                                                                                     | 24 |
| 19 Abnormal operation .....                                                                                                            | 24 |
| 20 Stability and mechanical hazards.....                                                                                               | 27 |
| 21 Mechanical strength .....                                                                                                           | 28 |
| 22 Construction .....                                                                                                                  | 29 |
| 23 Internal wiring.....                                                                                                                | 35 |
| 24 Components .....                                                                                                                    | 35 |
| 25 Supply connection and external flexible cords .....                                                                                 | 36 |
| 26 Terminals for external conductors.....                                                                                              | 36 |
| 27 Provision for earthing .....                                                                                                        | 36 |
| 28 Screws and connections .....                                                                                                        | 36 |
| 29 Clearances, creepage distances and solid insulation .....                                                                           | 37 |
| 30 Resistance to heat and fire .....                                                                                                   | 37 |
| 31 Resistance to rusting .....                                                                                                         | 37 |
| 32 Radiation, toxicity and similar hazards.....                                                                                        | 37 |
| Annexes .....                                                                                                                          | 44 |
| Annex B (normative) Battery-operated appliances, separable batteries and detachable<br>batteries for battery-operated appliances ..... | 45 |
| Annex C (normative) Ageing test on motors .....                                                                                        | 46 |
| Annex R (normative) Software evaluation .....                                                                                          | 47 |
| Bibliography.....                                                                                                                      | 48 |

Figure 101 – Probe for measuring surface temperatures .....

|                                                                                                                                 |        |
|---------------------------------------------------------------------------------------------------------------------------------|--------|
| Figure 102 – Schematic representation of the 30 ml spillage test .....                                                          | 38     |
| Figure 103 – Arrangement of work surface for spillage test on built-in appliances .....                                         | 38     |
| Figure 104 – Spillage solution bottle .....                                                                                     | 39     |
| Figure 105 – Detail of bottle cap and position of hole .....                                                                    | 39     |
| Figure 106 – Bottle position for the spillage test .....                                                                        | 40     |
| Figure 107 – Test cabinet including separation board, position of funnel and example<br>for direction of tilt .....             | 40     |
| Figure 108 – Schematic representation of the clamp position of different designs .....                                          | 41     |
| Figure 109 – Schematic representation of the horizontal movement test .....                                                     | 42     |
| Figure 110 – Schematic representation of the vertical movement test .....                                                       | 42     |
| Figure 111 – Rotation of the frothing or hot water nozzle .....                                                                 | 43     |
| <br>Table 101 – Maximum temperature rises for specified external accessible surfaces<br>under normal operating conditions ..... | <br>19 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –****Part 2-15: Particular requirements for appliances for heating liquids****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60335-2-15 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This seventh edition cancels and replaces the sixth edition published in 2012, Amendment 1:2016 and Amendment 2:2018. This edition constitutes a technical revision.

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

- a) alignment with IEC 60335-1:2020;
- b) conversion of some notes to normative text (Clause 1, 8.1.2, 11.7.104, 15.2, 15.101);
- c) introduction of surface temperature limits (3.6.102, 7.1, 7.6, 7.12, 7.14, 7.15, 11.1, 11.3, 11.101);

- d) addition of instructions for appliances with liquid containers made from polycarbonate material and kettles (7.12);
- e) introduction of test probe 18 and clarification of the application force for test probes in 20.103;
- f) improvement of spillage test for coffee-makers with a removable coffee pot and addition of test for appliances with a surface that will support a cup of vessel (15.2);
- g) specified that kettles are to be tested with NaCl instead of the spillage solution (15.2);
- h) addition of spillage tests for built-in appliances (15.104, 15.105);
- i) addition of compliance criteria for impact testing on glass containers of kettles, coffee-makers and tea makers (21.1);
- j) addition of requirements for the strength of kettle handles (21.101, 21.102);
- k) clarification of requirements for drain holes (22.6);
- l) added requirements for remote operation (22.49, 22.51);
- m) clarification of test method evaluation of appliance couplers for cordless appliances (22.103);
- n) clarification of requirements for pressure cookers (22.108, 22.108.1, 22.108.2, 22.109);
- o) revision of requirements for the maximum rotation angle of a frothing or hot water nozzle (22.115, R.2.2.5, R.2.2.9);
- p) addition of requirements for programmable electronic circuits that limit the number of heating elements and motors able to operate at the same time (22.116, R.2.2.5, R.2.2.9).

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

| Draft        | Report on voting |
|--------------|------------------|
| 61/7289/FDIS | 61/7332/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/publications](http://www.iec.ch/publications).

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 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 appliances for heating liquids.

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 following differences exist in the countries indicated below.

- 1: In AU and NZ, there are additional construction and abnormal requirements for all-in-one appliances that do not have pressure cooker functions
- 19.101: The test is not applicable (Japan).
- 25.8: A supply cord having a cross-sectional area of 0,75 mm<sup>2</sup> is not allowed for appliances having a rated current exceeding 6 A (Japan).
- 25.8: Longer supply cords are allowed (Japan).

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, or
- revised.

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

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

## 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 can 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 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.

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 of 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 2-15: Particular requirements for appliances for heating liquids

#### 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrical appliances for heating liquids for household and similar purposes, their **rated voltage** being not more than 250 V including direct current (DC) supplied appliances and **battery-operated appliances**.

Some appliances in this standard are used for heating food.

Examples of appliances that are within the scope of this standard are:

- coffee-makers;
- cooking pans;
- egg boilers;
- **feeding-bottle heaters**;
- kettles and other appliances for boiling water, having a **rated capacity** not exceeding 10 l;
- milk heaters;
- pressure cookers having a **rated cooking pressure** not exceeding 140 kPa and a **rated capacity** not exceeding 10 l;
- **rice cookers**;
- slow cookers;
- **steam cookers**;
- **soy milk makers**;
- tea makers;
- wash boilers;
- yoghurt makers.

Appliances can have more than one function.

Appliances intended for normal household and similar use and that can also be used by laypersons in shops, in light industry and on farms, are within the scope of this standard. Examples of such appliances are glue pots with a water jacket, livestock feed boilers and sterilizers.

If the appliance is intended to be used professionally to process food for commercial consumption, the appliance is not considered to be for household and similar use only.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account:

- persons (including children) whose
  - physical, sensory or mental capabilities; or
  - lack of experience and knowledgeprevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements 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;
  - additional national requirements for pressure vessels are specified for pressure cookers.

This standard does not apply to

- frying pans and deep fat fryers (IEC 60335-2-13);
- storage water heaters (IEC 60335-2-21);
- instantaneous water heaters (IEC 60335-2-35);
- surface-cleaning appliances employing liquids or steam (IEC 60335-2-54);
- portable immersion heaters (IEC 60335-2-74);
- commercial dispensing appliances and vending machines (IEC 60335-2-75);
- appliances for medical purposes (IEC 60601);
- appliances intended 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 high-frequency heating;
- pressure sterilizers;
- humidifiers for household and similar use (IEC 60335-2-98).

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

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

### 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

#### 3.1 Definitions relating to physical characteristics

##### 3.1.9 *Modification:* **normal operation**

Replace the first paragraph with the following:

operation of the appliance under the conditions specified in 3.1.9.101 to 3.1.9.107

**3.1.9.101** Kettles, thermal pots, urns and other appliances for boiling water, cooking pans, glue pots, milk heaters, slow cookers, sterilizers, wash boilers and yoghurt makers are operated with their container filled with the **rated capacity** of water, any lid being closed. The quantity of water in slow cookers is maintained above 50 % of their **rated capacity**.

Coffee-makers are operated in accordance with their instructions with the water container filled to its **rated capacity** and bean container, if any, filled with coffee beans. The warming plate and all other energy consuming functions, if any, are switched on.

Appliances with a heated surface intended to keep the liquid warm are operated with or without the container, whichever is the more unfavourable.

**3.1.9.102** Egg boilers and **steam cookers** are operated with their containers filled with the maximum quantity of water specified in the instructions.

**3.1.9.103 Feeding-bottle heaters** are operated with a bottle of heat-resistant glass, round or hexagonal in shape, having a mass between 190 g and 200 g and a capacity of approximately 225 ml, unless a particular bottle is specified, in which case that bottle is used. The bottle is filled to approximately its **rated capacity** of water or 200 ml, whichever is less, and is placed in the **feeding-bottle heater**. The heater is filled with water to the level specified in the instructions or, in the absence of instructions, to the maximum level.

**3.1.9.104** Livestock feed boilers are operated with the lid closed; the container being filled with half its **rated capacity** of water.

**3.1.9.105** Pressure cookers are operated in accordance with the instructions but with the container filled with water to a depth of 25 mm.

**3.1.9.106 Rice cookers** are operated with the rice container filled with water to the level of maximum **rated capacity**. Water is added to maintain the level during boiling as necessary.

When operated in the keep-warm mode, the **rice cooker** is operated with the rice container empty.

**3.1.9.107 Soy milk makers** are operated with the container filled with soy beans in accordance with the instructions and water to the **rated capacity**.

##### 3.1.101

##### **rated capacity**

capacity assigned to the appliance by the manufacturer

##### 3.1.102

##### **rated cooking pressure**

pressure assigned to the appliance by the manufacturer

### 3.5 Definitions relating to types of appliances

#### 3.5.101

**espresso coffee-maker**

coffee-maker in which water is heated and forced through the ground coffee by steam pressure or by means of a pump

Note 1 to entry: **Espresso coffee-makers** can have an outlet for supplying steam or hot water.

#### 3.5.102

**feeding-bottle heater**

appliance for heating prepared baby food in a feeding-bottle, heat being transferred by means of water

Note 1 to entry: **Feeding-bottle heaters** can have a control to set the temperature or time to a predetermined level.

#### 3.5.103

**cordless kettle**

kettle incorporating a heating element and which is connected to the supply only when placed on its associated stand

#### 3.5.104

**steam cooker**

appliance in which food is heated by steam generated at atmospheric pressure

#### 3.5.105

**rice cooker**

appliance for cooking rice that is placed in a **detachable container**, the container being placed within the appliance when cooking

Note 1 to entry: **Rice cookers** can have a keep warm function.

Note 2 to entry: **Rice cookers** can cook food other than rice.

#### 3.5.106

**induction rice cooker**

**rice cooker** that heats the rice container by means of eddy currents

Note 1 to entry: The eddy currents are induced in the rice container or lid or rice container and lid by the electromagnetic field of a coil.

#### 3.5.107

**cordless appliance**

appliance incorporating a heating element and which is connected to the supply only when placed on its associated stand

#### 3.5.108

**dynamic pressure cooker**

pressure cooker which reduces the pressure by a dynamic action of an elastic part

#### 3.5.109

**soy milk maker**

appliance with heating, pulverising and agitating functions that are intended to make soy milk

### 3.6 Definitions relating to parts of an appliance

#### 3.6.101

##### **decorative door**

part of an appliance having the same function as a cabinet door

#### 3.6.102

##### **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.

### 3.7 Definitions relating to safety components

#### 3.7.101

##### **pressure regulator**

control that maintains the pressure at a particular value during normal use

#### 3.7.102

##### **pressure-relief device**

control that limits the pressure under abnormal operating conditions

## 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:

*If the test of 15.101 has to be carried out, three additional samples are required.*

*The tests of 21.101 and 21.102 may be carried out on separate appliances.*

### 5.3 Addition:

*The test of 19.101 is carried out after the other tests.*

*The tests of 22.102, 22.110 and 22.111 are carried out during the test of Clause 11.*

**5.101 Induction rice cookers are tested as motor-operated appliances.**

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.2 Addition:

Wash boilers and livestock feed boilers shall be at least IPX3.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

Appliances intended to be partially immersed in water for cleaning shall be marked with the maximum level of immersion and with the substance of the following:

Do not immerse beyond this level.

Kettles shall have a level mark or other means to indicate when they are filled to **rated capacity**, unless they cannot be filled beyond the **rated capacity**. This indication shall be visible when the kettle is in the filling position. If the level mark is not self-evident, there shall be a reference to this mark on the outside of the kettle which shall be visible when the kettle is in its normal position of use.

If the closed position of the lid of a pressure cooker is not obvious, this position shall be marked on the appliance.

Stands provided with **cordless appliances** shall be marked with:

- the name, trademark or identification mark of the manufacturer or responsible vendor;
- the model or type reference.

**Soy milk makers** shall have a level mark or other means to indicate when they are filled to **rated capacity**, unless they cannot be filled beyond the **rated capacity**.

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 surface

### 7.6 Add the following



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

caution, hot surface

### 7.12 Addition:

The instructions for appliances shall include the substance of the following:

This appliance is intended to be used in household and similar applications such as:

- staff kitchen areas in shops, offices and other working environments;
- farm houses;
- by clients in hotels, motels and other residential type environments;
- bed and breakfast type environments.

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

The instructions for appliances incorporating an appliance inlet, and intended to be partially or fully immersed in water for cleaning, shall state that the connector must be removed before the appliance is cleaned and that the appliance inlet must be dried before the appliance is used again.

The instructions for appliances normally cleaned after use, and not intended to be immersed in water for cleaning, shall state that the appliance must not be immersed. This requirement normally applies to coffee-makers, cooking pans, milk heaters, pressure cookers, **steam cookers**, slow cookers, **soy milk makers** and yoghurt makers.

The instructions for appliances intended to be used with a connector incorporating a **thermostat** shall state that only the appropriate connector must be used.

Unless kettles are constructed so that a hazard cannot arise from boiling water being ejected, the instructions shall state that if the kettle is overfilled, boiling water can be ejected.

The instructions for kettles filled through a lid aperture situated below the handle shall include the substance of the following:

- **WARNING:** Do not remove the lid while the water is boiling.
- **CAUTION:** Position the lid so that steam is directed away from the handle.

The caution statement is not required if the lid can only be closed so that steam is directed away from the handle.

The instructions for **cordless appliances** shall state that the appliance is only to be used with the stand provided.

If the appliance and stand of **cordless appliances** can be lifted together by gripping the handle of the appliance, the instructions shall include the substance of the following:

- **CAUTION:** Ensure that the appliance is switched off before removing it from its stand.

The instructions for **feeding-bottle heaters** shall state:

- that the food should not be heated for too long;
- how to check that the correct food temperature has not been exceeded.

The instructions for **feeding-bottle heaters** that do not switch off automatically shall additionally include an instruction to switch off the **feeding-bottle heater** after use.

The instructions for pressure cookers, other than **dynamic pressure cookers**, shall state that the ducts in the **pressure regulator** allowing the escape of steam should be checked regularly to ensure that they are not blocked.

The instructions for pressure cookers shall also give details of how to open the container safely and state that the container must not be opened until the pressure has decreased sufficiently.

The instructions for egg boilers provided with a pricking device shall contain the substance of the following:

**CAUTION:** Avoid injuries from the egg pricking device.

For **espresso coffee-makers** incorporating a pressurized reservoir filled by the user, the instructions shall contain information for the safe refilling of the water reservoir and the substance of the following:

**WARNING:** The filling aperture must not be opened during use.

The instructions for all appliances shall include:

- a warning to avoid spillage on the connector;
- details on how to clean the surfaces in contact with food;
- a warning of potential injury from misuse;
- a statement that the heating element surface is subject to residual heat after use.

The instructions for **soy milk makers** shall also include a statement that care shall be taken when handling the sharp cutting blades, emptying the container and during cleaning.

The instruction for **soy milk makers** incorporating a switch necessary for compliance with 22.40 shall include the substance of the following:

Switch off the appliance and disconnect from supply before changing accessories or approaching parts that move in use.

The instructions for coffee-makers other than **built-in coffee-makers** or those tested in a cabinet, shall state that the coffee-maker shall not be placed in a cabinet when in use.

For coffee-makers having an additional **decorative door**, and for coffee-makers intended to be used in a cabinet, the instructions shall state that the coffee-maker must be operated with the **decorative door** open or the cabinet door open.

The instructions for coffee-makers having surfaces of glass, ceramic or similar material that forms part of the enclosure of **live parts** shall include the substance of the following:

WARNING: Do not use the appliance if the surface is cracked.

The instructions for coffee-makers shall state that cleaning and **user maintenance** shall not be made by children without supervision.

If symbol IEC 60417-5041(2002-10) is marked on the appliance, its meaning shall be explained.

The instructions for appliances with liquid containers made from polycarbonate material that are accessible to the user shall state the substance of the following:

CAUTION: To prevent damage to the appliance, do not use aggressive cleaning agents when cleaning. Use a soft cloth and a mild detergent.

CAUTION: Do not use the appliance if the enclosure is damaged or has visible cracks.

The instructions for kettles shall state the substance of the following:

CAUTION: Do not operate the kettle on an inclined plane. Do not switch on the kettle if there is no water in the kettle. Do not move the kettle while it is switched on.

#### 7.12.4 Addition:

For coffee-makers suitable for operation when placed in a cabinet, the minimum dimensions of the cabinet shall be given.

#### 7.14 Addition:

The height of the triangle in symbol IEC 60417-5041 (2002-10) shall be at least 8 mm.

#### 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**.

### 8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

#### 8.1.2 Addition:

Connecting devices in stands of **cordless appliances** are not considered to be socket-outlets.

### 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 except as follows.

#### 10.1 Addition:

*The power input of automatic coffee-makers is measured during one operating cycle that is selectable by the user, such as cleaning, descaling, or selecting a beverage. The measurement starts with the appliance at **room temperature**.*

*The operating cycle starts with the activation by the user and ends when the appliance stops the cycle automatically and the next operating cycle can be started by the user.*

#### 10.2 Addition:

*The input current of automatic coffee-makers is measured during one operating cycle that is selectable by the user, such as cleaning, descaling, or selecting a beverage. The measurement starts with the appliance at **room temperature**.*

*The operating cycle starts with the activation by the user and ends when the appliance stops the cycle automatically and the next operating cycle can be started by the user.*

### 11 Heating

This clause of Part 1 is applicable except as follows.

#### 11.1 Addition:

*Compliance is also checked by the test of 11.101.*

#### 11.2 Addition:

**Portable appliances** are tested away from the walls of the test corner. Coffee-makers with a **decorative door** or intended to be used in a cabinet shall be tested with the door open.

### 11.3 Addition:

During the test of 11.101, where the external **accessible surfaces** are suitably flat and access permits, then the test probe of 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.

NOTE 101 If the magnetic field of an **induction rice cooker** unduly influences the results, the temperature rises can be determined using platinum resistances with twisted connecting wires or any equivalent means.

### 11.4 Addition:

If the temperature rise limits are exceeded in appliances incorporating motors, transformers or **electronic circuits**, and if the power input is lower than the **rated power input**, the test is repeated with the appliance supplied at 1,06 times the **rated voltage**. Appliances with electronic power controls are operated as **combined appliances**.

### 11.6 Addition:

**Combined appliances** are operated as **heating appliances**.

### 11.7 Modification:

Replace the first paragraph with the following:

*Appliances are operated for the duration specified in 11.7.101 to 11.7.106.*

*For appliances incorporating **integral batteries** or **separable batteries** not disconnected from the appliance for charging purposes, the **battery** that has been **fully discharged** is charged while the appliance is operated as specified for 1 h or the time specified in 11.7.101 to 11.7.106, whichever comes first, if allowed by the construction of the appliance.*

Replace the first dashed item of the third paragraph with the following:

- the **battery** that has been **fully discharged** is charged while the appliance is operated as specified for 1 h or the time specified 11.7.101 to 11.7.106, whichever comes first, if allowed by the construction of the appliance;

**11.7.101** For kettles incorporating a **temperature limiter**, the **temperature limiter** is reset 1 min after it has operated or as soon as possible afterwards. The test is terminated after the **temperature limiter** has operated for the second time.

For kettles incorporating a **thermostat**, the test is terminated 15 min after the water has attained a temperature of 95 °C.

For other kettles, the test is terminated 5 min after the water has attained a temperature of 95 °C.

**11.7.102** For cooking pans, egg boilers, **feeding-bottle heaters**, glue pots, livestock feed boilers, milk heaters, sterilizers, wash boilers and for appliances that boil water other than kettles, the test is terminated

- for appliances without a thermal control, 15 min after the water in the container has attained a temperature of 95 °C or the maximum temperature it can attain if this is lower

- for **portable appliances** provided with a thermal control, 15 min after the thermal control has operated for the first time;
- for **fixed appliances** provided with a thermal control, 30 min after the thermal control has operated for the first time;
- 1 min after a continuous or repetitive acoustic signal having intervals of less than 5 s has sounded;
- when steady conditions are established, for egg boilers having provision for keeping eggs warm, and appliances having a heated surface intended to keep liquid warm.

**11.7.103** Slow cookers, **rice cookers**, **steam cookers** and yoghurt makers are operated until steady conditions are established. Slow cookers are prewarmed in the dry state if this instruction is given.

**11.7.104** For **espresso coffee-makers**, the brewing period is followed by a rest period of 1 min or the period stated in the instructions, if this is longer. The water container is refilled during the rest periods.

For automatic **espresso coffee-makers** and **espresso coffee-makers** provided with a coffee pot, the brewing period is the time necessary to produce the maximum quantity of coffee allowed by the timer or by the capacity of the coffee pot.

For manual **espresso coffee-makers**, if the maximum quantity of coffee to be produced is not specified in the instructions, the brewing period is the time necessary to produce 100 ml of coffee for each cycle.

For **espresso coffee-makers** having an outlet for supplying steam or hot water, the brewing period is immediately followed by a period during which the steam or water is supplied for the time stated in the instructions or for the following periods, whichever is more unfavourable:

- for **espresso coffee-makers** having an outlet for supplying steam, 1 min;
- for **espresso coffee-makers** having an outlet for supplying hot water, the time necessary to produce 100 ml of water.
- for **espresso coffee-makers** having an outlet for supplying steam and an outlet for supplying hot water, 1 min period supplying steam is followed by time necessary to produce 100 ml of water.

The steam is blown into a vessel containing cold water.

**Espresso coffee-makers** are operated until steady conditions are established.

Other coffee-makers are operated for the time necessary to make the maximum quantity of coffee stated in the instructions. The container is then refilled as quickly as possible and the coffee-maker operated again.

The procedure is repeated until steady conditions are established.

**11.7.105** Pressure cookers are operated for 15 min after attaining the maximum cooking pressure.

**11.7.106** **Soy milk makers** are operated for a complete operating cycle.

## **11.8** Addition:

When an appliance connector incorporates a **thermostat**, the temperature rise limit for the pins of the inlet does not apply.

The temperature rise limits of motors, transformers and components of **electronic circuits**, including parts directly influenced by them, may be exceeded when the appliance is operated at 1,15 times **rated power input**.

**11.101** Appliances are placed as specified in 11.2 and are operated at **rated power input** under **normal operation** for the duration specified in 11.7.

During the test, the temperature rise of surfaces shall not exceed the values specified in Table 101.

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

| Surface                                              | Temperature rise of external accessible surfaces <sup>a, b</sup>                          |                                                                                             |
|------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|                                                      | K                                                                                         |                                                                                             |
|                                                      | Surfaces of appliances intended to be placed or installed less than 850 mm from the floor | Surfaces of appliances intended to be placed or installed at or above 850 mm from the floor |
| Bare metal                                           | 38                                                                                        | 42                                                                                          |
| Coated metal <sup>c</sup>                            | 42                                                                                        | 49                                                                                          |
| Glass and ceramic                                    | 51                                                                                        | 56                                                                                          |
| Plastic and plastic coating > 0,4 mm <sup>d, e</sup> | 58                                                                                        | 62                                                                                          |

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

<sup>a</sup> Temperature rises are not measured on:

- the underside of appliances intended to be used on a working surface or floor, where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end;
- the fittings and hoses for hot water, vapour, coffee, tea and similar fluids, including **pressure regulators** and **pressure-relief devices**;
- **functional surfaces**;
- surfaces within 25 mm of the outline of the **functional surfaces**;
- lids and covers;
- surfaces within 25 mm from the edge of lids;
- surfaces within 25 mm from ventilation openings;
- vessels that contain hot liquids and that become hot through conduction by a heated part of the appliance (e.g. coffee pots and coffee filter holders in percolator type coffee-makers and kettles).

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

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

<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.

<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.

## 12 Charging of metal-ion batteries

This clause of Part 1 is applicable.

### 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

### 14 Transient overvoltages

This clause of Part 1 is applicable.

### 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

#### 15.2 Addition:

For kettles, replace the first paragraph of the test specification by the following:

*For kettles, compliance is checked by the following test using a solution comprising water containing approximately 1 % NaCl.*

For steam sterilizers, replace the fifth paragraph of the test specification by the following:

*Steam sterilizers are placed on a horizontal surface and 30 ml of the spillage solution is poured onto the top rim in the most unfavourable place. The spillage solution is poured steadily through a tube having an inner diameter of 8 mm over a period of 2 s, the lower end of the tube being 200 mm above the appliance.*

NOTE 101 A schematic representation of the test arrangement is shown in Figure 102.

*The test is only carried out with the appliance connector in position.*

*For **rice cookers**, the test specified in Part 1 shall be conducted with the rice container in place.*

*In case of doubt, the spillage test is carried out with the appliance deviating from the normal position of use by an angle not exceeding 5°.*

*Kettles are filled to **rated capacity** with water. They are placed on a plane inclined at an angle of 20° to the horizontal with their spout facing up the slope of the inclined plane. Water shall not be discharged from the kettle.*

*Kettles that can be filled through the spout are also tested on a plane inclined at an angle of 20° to the horizontal, with the spout uppermost. The kettle is filled with water containing approximately 1 % NaCl to the maximum level, if this indication is visible from the filling position, otherwise until water spills from the kettle. A further quantity, equal to 15 % of the **rated capacity** of the kettle, is then added as quickly as possible.*

*For **cordless appliances**, the test with the appliance on the horizontal plane is carried out with the appliance both on and off its stand. The additional test for kettles that can be filled through the spout is carried out only with the **cordless kettle** off its stand, the kettle being replaced on its stand in order to carry out the electric strength test of 16.3.*

*For coffee-makers provided with a removable coffee pot, the funnel is placed in position but without placing the coffee pot in position. The spillage solution is manually poured steadily into the funnel without the solution overflowing from the funnel. The quantity of the spillage solution is the maximum capacity of the water supply tank. If the top opening of the funnel is enclosed in the coffee-maker, the funnel is moved out, filled with its capacity of the spillage solution, and set back into the coffee-maker, this operation being repeated until the maximum quantity of the solution is poured. If there is an anti-drop mechanism in the funnel, the mechanism is rendered inoperative.*

*Coffee-makers dispensing liquid into a serving container, such as a cup or jug, are tested by steadily pouring 0,5 l of the spillage solution over the surface where the container is filled or the container is transported and removed by the user. If a drop container is placed beneath this surface, the drop container is completely filled before the test is carried out.*

*Coffee-makers having external surfaces on which it is possible to place a vessel, such as a cup or jug, are tested by pouring 0,2 l of the spillage solution rapidly over the top of the appliance in the most unfavourable way so that the spillage solution also flows over the surface of the appliance that incorporates controls and other places where it can penetrate the appliance enclosure, the controls being placed in the most unfavourable position. The controls are then operated through their working range, this operation being repeated after 5 min. If necessary, the test is repeated until all different controls or gaps are covered by the spillage test, the appliance being dried between each test. External surfaces with a minimum linear dimension of a horizontal or near horizontal top surface of 75 mm or less are not considered to be surfaces on which it is possible to place a vessel or cup.*

*For coffee-makers, after each overfilling test or application of liquid, all residues are then removed and the appliance is dried.*

**15.101** Appliances intended to be partially or completely immersed in water for cleaning shall have adequate protection against the effects of immersion.

*Compliance is checked by the following tests, which are carried out on three additional appliances.*

*The appliances are operated under **normal operation** at 1,15 times **rated power input**, until the **thermostat** operates for the first time. Appliances without a **thermostat** are operated until steady conditions are established. The appliances are disconnected from the supply, any appliance connector being withdrawn. They are then completely immersed in water containing approximately 1 % NaCl and having a temperature between 10 °C and 25 °C, unless they are marked with the maximum level of immersion, in which case they are immersed 50 mm deeper than this level.*

*After 1 h, the appliances are removed from the saline solution, dried and subjected to the leakage current test of 16.2.*

*Care is taken to ensure that all moisture is removed from the insulation around the pins of appliance inlets.*

*This test is carried out four more times, after which the appliances shall withstand the electric strength test of 16.3, the voltage being as specified in Table 4.*

*The appliance having the highest leakage current after the fifth immersion is dismantled and inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

The remaining two appliances are operated under **normal operation** at 1,15 times **rated power input** for 240 h. After this period, the appliances are disconnected from the supply and immersed again for 1 h. They are then dried and subjected to the electric strength test of 16.3, the voltage being as specified in Table 4.

Inspection shall show that there is no trace of liquid on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.

**15.102** The connecting devices of stands for **cordless appliances** shall not be affected by water.

*Compliance is checked by the following test.*

The stand is placed on a horizontal surface and 30 ml of water containing approximately 1 % NaCl is poured onto the connecting device. The solution is poured steadily through a tube having an inner diameter of 8 mm over a period of 2 s, the lower end of the tube being 200 mm above the connecting device.

NOTE A schematic representation of the test arrangement is shown in Figure 102.

The stand shall then withstand the electric strength test of 16.3, the test voltage for **reinforced insulation** being 2 500 V.

**15.103** The interior of **rice cookers** shall not be affected by water.

*Compliance is checked by the following test.*

The **rice cooker** is placed on a horizontal surface, with the rice container removed and 30 ml of water containing approximately 1 % NaCl is poured on to the centre of the bottom of the interior of the **rice cooker**. The saline solution is poured steadily through a tube having an inner diameter of 8 mm and a length of 30 mm, over a period of 2 s, the lower end of the tube being 200 mm above the bottom of the **rice cooker**.

NOTE A schematic representation of the test arrangement is shown in Figure 102.

The **rice cooker** shall then withstand the electric strength test of 16.3.

**15.104 Built-in appliances** intended to be installed in a cabinet and therefore subject to spillage of liquid onto work surfaces located above the appliance after installation shall be constructed so that such spillage does not affect their electrical insulation.

*Compliance is checked by the following test.*

The appliance is subjected to a spillage test with 0,5 l of the spillage solution specified in 15.2. The appliance shall be installed according to the manufacturer's instructions except that the front surface of the appliances (excluding control knobs, handles) shall align with the front edge of a 30 mm thick wooden work surface with a square front edge, see Figure 103. The spillage solution shall be poured on the work surface at the area which gives the most unfavourable conditions representing the pouring likely to occur, so that the spillage solution flows down the front surface of the appliance over controls, joints, vents and similar openings. If necessary, the test is repeated until all different controls or gaps are covered by the spillage test. The appliance is dried between each test.

*The test is performed as follows:*

A bottle with a shape similar to the one in Figure 104 and a cap is filled with 0,5 l of the spillage solution.

*The cap of the bottle shall have a hole of 8 mm diameter, placed off-centre according to Figure 105. The bottle shall also have a hole of 8 mm diameter near the bottle base (see Figure 104) to equalize the liquid pressure.*

*Other suitable containers may be used provided the spillage solution amount is poured over the appliance under test in the same manner.*

*The hole in the cap of the bottle is put on the horizontal work surface at approximately 80 mm horizontal distance with respect to the front of the appliance. The inclination of the bottle shall be higher than 30° and lower than 45° to allow the spillage solution to flow over the front of the appliance. The lower part of the bottle hole in the cap shall be in contact with the work surface, with the hole in the cap placed down closest to the surface. See Figure 106.*

*When using holes of 8 mm diameter, the specified solution amount is spilled in about 15 s.*

*When the 0,5 l of spillage solution has been poured, the remaining solution on the work surface is pushed towards the front so that the remaining solution spills homogeneously over the front with a suitably flat means.*

*Immediately after the test, the appliance shall withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **clearances** or **creepage distances** below the values specified in Clause 29.*

**15.105 Built-in appliances** intended to be installed in cabinets below other **built-in appliances** and therefore subject to spillage of liquid during use of these other appliances shall be constructed so that such spillage does not affect their electrical insulation.

*Compliance is checked by the following test (see Figure 107). The appliance is built-in as specified in the instructions. The test cabinet is tilted to an angle of 2° in the most unfavourable direction. 200 ml of the spillage solution specified in 15.2 is poured steadily over a period of 8 s through a funnel onto the complete width of the separation board above the appliance being tested. The funnel has an outlet diameter of approximately 8 mm and the lower edge of its outlet is positioned 20 mm above the separation board. The centre of the funnel is positioned 15 mm inwards from the leading edge of the separation board.*

*If the manufacturer states in the installation instructions that a separation board above the appliance is not required, the test shall be repeated while pouring the spillage solution directly onto the complete width of the top surface of the appliance. The lower edge of the funnel outlet is positioned 20 mm above the top surface of the appliance and its centre is positioned 15 mm inwards from the leading edge of the appliance.*

*Immediately after the test, the appliance shall withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **clearances** or **creepage distances** below the values specified in Clause 29.*

## 16 Leakage current and electric strength

This clause of Part 1 is applicable.

## 17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

## 18 Endurance

This clause of Part 1 is not applicable.

## 19 Abnormal operation

This clause of Part 1 is applicable except as follows.

### 19.1 Addition:

*Kettles are not subjected to the test of 19.2.*

*Kettles are also subjected to the test of 19.101, unless the appliance incorporates a **non-self-resetting thermal cut-out** that is not resettable by the user, in order to comply with 19.4.*

*Kettles for which compliance with 19.101 relies on the operation of a **self-resetting thermal cut-out** are also subjected to the test of 19.102.*

*For appliances with an external surface providing a keep warm function, the test of 19.106 applies.*

*For coffee-makers having a **decorative door**, the test of 19.107 applies.*

*For automatic coffee-makers of the coffee bean type, the tests of 19.108 applies.*

### 19.2 Addition:

*Appliances are placed as near as possible to the walls of the test corner. They are tested empty with lids open or closed whichever is more unfavourable.*

***Induction rice cookers** are operated under the conditions of Clause 11 with the rice container empty.*

### 19.3 Addition:

*Kettles are operated empty at 1,15 times **rated power input**.*

*The test is also carried out with the kettle filled with sufficient water to cover the heating element, or to a depth of 10 mm if the heating element is not positioned inside the container, the lid being open or closed, whichever is more unfavourable.*

### 19.4 Addition:

*For pressure cookers,*

- *all **pressure regulating devices** are rendered inoperative; and*
- *in other than **dynamic pressure cookers**, all **protective devices** that vent steam and **intentionally weak parts** that vent steam are rendered inoperative; and*
- *in **dynamic pressure cookers**, all **protective devices**, other than **intentionally weak parts**, that vent steam are rendered inoperative.*

### 19.7 Addition:

***Espresso coffee-makers** incorporating a pump are operated for a period of 5 min.*

**Soy milk makers** are operated for one cycle of operation.

#### 19.13 Addition:

During the test of 19.4, **protective devices** of pressure cookers other than **dynamic pressure cookers** shall operate before the pressure has reached 350 kPa.

During the test of 19.4, **protective devices** or **intentionally weak parts** of **dynamic pressure cookers** shall operate before the pressure has reached 250 kPa.

The temperature rise of the windings of **induction rice cookers** shall not exceed the values specified in 19.7.

The electric strength test of **induction rice cookers** is carried out immediately after switching off the appliance.

**19.101** Kettles are placed on a plywood board having a thickness of approximately 20 mm. The **thermal cut-out** that operates during the test of 19.4 and all thermal controls that operate during the test of Clause 11 are short circuited simultaneously and the kettle is operated empty at 0,85 times **rated power input** or 1,15 times **rated power input**, whichever is more unfavourable. If the kettle incorporates more than one **thermal cut-out** that could operate during the test of 19.4, they are short circuited in turn.

During the test, any flames shall be kept within the enclosure of the kettle and the supporting surface shall not ignite.

After the test, and when the insulation has cooled down to approximately **room temperature**, **live parts** shall not be accessible, and the kettle shall pass the dielectric strength test in 16.3 with the test voltage specified in Table 4.

The humidity treatment of 15.3 is not applied before the electric strength test is carried out.

The kettle is filled to its **rated capacity** with water for 24 h before the electric strength test is carried out. Other requirements of 19.13 are not applicable.

**19.102** Kettles are placed on a plywood board having a thickness of approximately 20 mm.

Kettles incorporating two **self-resetting thermal cut-outs** are operated with one of the **thermal cut-outs** short circuited. The kettle is operated empty at 0,85 times **rated power input** or 1,15 times **rated power input**, whichever is more unfavourable.

Within 2 s of the other **thermal cut-out** operating, the kettle is filled with water having a temperature of  $15\text{ °C} \pm 5\text{ °C}$ . After 1 min, the kettle is emptied.

The test is carried out 100 times.

**19.103** For appliances with **detachable liquid containers**, the automatic transfer of liquid from one container to another shall not give rise to an electrical hazard if they are incorrectly positioned.

Compliance is checked by assembling the appliance with its receiving container incorrectly positioned or removed. The water discharge pipe is incorrectly positioned if this is more unfavourable. The appliance is operated as specified in Clause 11 but for one cycle only.

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in the reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

**19.104** The overloading of a **soy milk maker** shall not result in a hazard.

*Compliance is checked by the following test.*

**Soy milk makers** are placed on a plywood board having a thickness of approximately 20 mm and operated under the conditions of Clause 11 with the container filled with 2 times the maximum mass of the soy beans specified in the instructions and water to **rated capacity**.

*During the test, any flames shall be kept within the enclosure and the supporting surface shall not ignite.*

*After the test, **live parts** shall not be accessible.*

**19.105** When a **soy milk maker** is disconnected from the supply accidentally during normal use, it shall not result in a hazard.

*Compliance is checked by the following test.*

**Soy milk makers** are placed on a plywood board having a thickness of approximately 20 mm and operated under the conditions of Clause 11. The appliance shall be disconnected from the supply at the most unfavourable time during the cycle. The **soy milk maker** is then restarted with a new cycle of operation without changing the load.

*During the test, any flames shall be kept within the enclosure and the supporting surface shall not ignite.*

*After the test, **live parts** shall not be accessible.*

**19.106** The appliance is operated at **rated power input** with the heated surface completely covered with two layers of textile material of pre-washed double-hemmed cotton sheets until steady conditions are established.

The textile material consists of pre-washed double-hemmed cotton sheet having dimensions approximately 700 mm × 700 mm and specific mass between 140 g/m<sup>2</sup> and 175 g/m<sup>2</sup> in the dry condition.

*If a **thermostat** operates, the test is repeated with the one-third of the heated surface furthest from the temperature-sensing element covered.*

*The textile material shall not ignite.*

**19.107** Coffee-makers with a **decorative door** or intended to be used in a cabinet are operated under the conditions specified in Clause 11 but with the **decorative door** or cabinet door closed.

**19.108** Automatic coffee-makers of the coffee bean type, other than automatic **espresso coffee-makers** of the coffee bean type, are supplied at **rated voltage** and operated under **normal operation** five times with rest periods.

Automatic **espresso coffee-makers** of the coffee bean type are supplied at **rated voltage** and are set to maximum quantity of coffee powder, with the smallest amount of coffee in the cup according to the instructions without rest periods.

*The duration of the operating period is:*

- *for appliances incorporating a timer, the longest period allowed by the timer;*
- *for other appliances, as follows:*
  - *for automatic coffee-makers incorporating coffee mills of the grinding type, 30 s longer than the time needed to fill the collecting container or the time required to empty the hopper, whichever is shorter;*
  - *for automatic coffee-makers incorporating other coffee mills, 1 min.*

*The duration of the rest period is:*

- *10 s, for appliances provided with a collecting container;*
- *60 s, for other appliances.*

*The temperature of the windings shall not exceed the values shown in Table 8.*

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

### 20.2 Addition:

For **soy milk makers**, test probe 18 is not applied to the cutting blades.

**20.101** The container and cutting blades of **soy milk makers** shall have adequate mechanical strength.

*Compliance is checked by the following test.*

*The **soy milk maker** is supplied at **rated voltage** and is operated continuously with the container filled with dry soy beans to the **rated capacity**. The test is carried out as follows:*

- *for appliances with accumulated working time of the motor during one cycle not exceeding 4 min, the test is conducted for the accumulated working time of the motor during one complete working cycle plus 1 min;*
- *for appliances with accumulated working time of the motor during one cycle exceeding 4 min, the test is conducted for the accumulated working time of the motor during one complete working cycle.*

*Care needs to be taken to ensure that the cutting blades are not jammed by the soy beans, and that they rotate continuously during the test.*

*After the test, the container and cutting blades shall not be broken; however, distorted and blunt edges are ignored.*

**20.102** The rotating parts of **soy milk makers** shall be secured so that they do not become loose during operation.

*Compliance is checked by inspection and manual test.*

*Fastening of screws and nuts in a direction opposite to the direction of rotation of the rotating parts is considered to be a suitable means of securing the rotating parts.*

**20.103** The lid interlock, if any, of **soy milk makers** shall be constructed so that accidental operation of the appliance is prevented. Lid interlock switches shall be **biased-off switches**.

If there is an interlock between the lid and the main switch, the lid shall be locked when the switch is in the on position. When the lid is not correctly closed, the switch shall be locked in the **off position**.

*Compliance is checked by inspection, by manual test and by applying test probe B of IEC 61032 with a force not exceeding 5 N and test probe 18 of IEC 61032 with a force not exceeding 2,5 N to the lid interlock actuator.*

*If compliance relies on the operation of an **electronic circuit** for the interlock function the moving parts shall not operate with the lid removed under the following conditions applied separately:*

- a) The fault conditions in a) to g) of 19.11.2 are applied one at a time to the **electronic circuit**.*
- b) The electromagnetic phenomena tests of 19.11.4.2 and 19.11.4.5 are applied. The tests are carried out with surge protective devices disconnected, unless they incorporate spark gaps.*

*If the **electronic circuit** is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of normative Annex R.*

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

### 21.1 Addition:

*Breakage of glass parts, other than glass water containers of kettles and glass coffee or tea containers of coffee-makers and tea makers, is neglected provided that compliance with 8.1, 15.1 and 15.101 is not impaired.*

*The glass of the water container of a kettle and the glass of the coffee or tea container of a coffee-maker or tea maker shall not break.*

NOTE In Australia and New Zealand the energy is increased to 1 J for glass kettles.

**21.101** The handle of kettles and its securement means shall be constructed to withstand the stresses occurring during normal use.

*Compliance is checked by inspection and by the following test.*

*Kettles shall be subjected to the following pre-treatment.*

*The empty kettle shall be placed in a heating cabinet. The cabinet is a single chamber type heating oven in accordance with IEC 60216-4-1 with regard to specimen mounting arrangement, temperature, differences, fluctuation and variations appropriate to the test temperature. The temperature of the cabinet is maintained at  $80\text{ °C} \pm 2\text{ °C}$ . The kettle is suspended at the centre of the grip area of the handle, taking care that the kettle is well balanced with the spout pointing radially outwards in a cabinet.*

*The kettle shall be at least 50 mm from all parts of the cabinet.*

*The kettle is kept in the cabinet for 168 h and then at **room temperature** for at least 16 h.*

NOTE 1 A schematic representation of the grip area is shown in Figure 108.

*The kettle is then loaded with sand sealed in a plastic bag to a mass that corresponds to 1,2 times the **rated capacity** of the kettle.*

*The load shall be prevented from falling out during the test.*

NOTE 2 There is no specific requirement for the type of sand and moisture content.

*For movement tests, the kettle is attached to the test apparatus at its handle in the grip area, taking care that the kettle is well balanced with the spout pointing radially outwards.*

*Between the test apparatus and the handle shall be of rubber of a thickness of 5 mm and a hardness of 50 Shore  $\pm$  10 Shore.*

*The clamping position shall be in the centre of the grip area of the handle. The distance between the pivot point and the centre of the grip area of the handle shall be 400 mm  $\pm$  10 mm.*

NOTE 3 A schematic representation of the clamp position is shown in samples in Figure 108.

*For the horizontal movement test, the kettle is moved, while maintaining the kettle in vertical orientation, to the left and back to the right in an arc of 90°. The movement is repeated 2 500 times at a rate of approximately 10 times per minute with uniform acceleration and deceleration.*

NOTE 4 A schematic representation of the test arrangement is shown in Figure 109.

*For a vertical movement test, the kettle is moved down and up in a pouring motion of 120°. The movement is repeated for 5 000 times at a rate of approximately 10 times per minute with uniform acceleration and deceleration.*

NOTE 5 A schematic representation of the test arrangement is shown in Figure 110.

*The kettle, the handle and its securement means shall not break, crack or loosen.*

**21.102** Kettles shall be constructed so that there are no sudden breaks of the handle or its securement means likely to expose the user to a hazard when the appliance is used as in normal use.

*Compliance checked by the following test.*

*The kettle is filled with the **rated capacity** of water when determining the mass of the filled kettle. A mass that is 2 times the mass of the filled kettle is hung from the centre of the bottom of the empty kettle. The kettle is gently lifted and suspended by the handle for 5 min.*

*The kettle, the handle and its securement mean shall not break, crack or loosen.*

## 22 Construction

This clause of Part 1 is applicable except as follows.

### 22.6 Addition:

A drain hole that is necessary to comply with the standard shall be at least 5 mm in diameter or 20 mm<sup>2</sup> in area with a width of at least 3 mm. Holes that do not meet these dimensions are considered to be blocked when determining compliance.

*Compliance is also checked by measurement.*

**22.7 Addition:**

**Espresso coffee-makers** are filled with water to their **rated capacity** and operated at **rated power input** with the coffee filter blocked and outlet closed. The maximum pressure attained is measured. The appliance is then subjected to twice the measured pressure for 5 min.

The overpressure may be supplied from an external source, care being taken to ensure that the **espresso coffee-maker** is at the normal temperature for brewing.

If the valve for steam supply is linked to the switch used for starting the production of steam, this link is not to be disturbed while measuring the maximum pressure.

The appliance shall not rupture and there shall be no leakage other than through a self-resetting **pressure-relief device** or **intentionally weak part**. If a self-resetting **pressure-relief device** operates, the appliance shall be suitable for further use.

Controls that limit the pressure are rendered inoperative and the appliance is operated again as described for determining the maximum pressure.

The appliance shall not explode or emit hazardous jets of steam. If an **intentionally weak part** ruptures, the test is repeated on a second appliance and shall be terminated in the same mode.

All pressure regulating devices and all **protective devices** and **intentionally weak parts** are rendered inoperative and the lid is closed.

For pressure cookers, other than **dynamic pressure cookers**, the pressure is gradually increased hydraulically to two times the operating pressure of the **protective device** during the test of 19.4.

For **dynamic pressure cookers**, the pressure is gradually increased hydraulically to 50 kPa in excess of the operating pressure of the **protective device** or **intentionally weak part** during the test of 19.4.

The container shall not rupture.

**22.40 Addition:**

For **soy milk makers**, any switch controlling the motor shall also disconnect **electronic circuits**, if their malfunction would impair compliance with this standard.

Compliance is checked by the tests of Clause 19.

**22.49 Replacement:**

For **remote operation**, the duration of operation of the function that is going to be remotely operated shall be set before the function is started, unless:

- the function switches off automatically at the end of a cycle, or
- the function can operate continuously without giving rise to a hazard.

Slow cookers, **rice cookers**, **steam cookers** and yoghurt makers, and appliances that automatically change to a keep warm function after the cooking or brewing cycle is completed are considered to be functions that can operate continuously without giving rise to a hazard.

Compliance is checked by inspection.