

INTERNATIONAL STANDARD

IEC
60335-2-15

Fifth edition
2002-07

Household and similar electrical appliances – Safety –

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

*Appareils électrodomestiques et analogues –
Sécurité –*

*Partie 2-15:
Règles particulières pour les appareils de chauffage
des liquides*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This fifth edition cancels and replaces the fourth edition published in 1995 and its amendments 1 (1999) and 2 (2000). It constitutes a technical revision.

The text of this part of IEC 60335 is based on the following documents:

FDIS	Report on voting
61/2134/FDIS	61/2159/RVD

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

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) of that standard.

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

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for electrical 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 committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

The following differences exist in the countries indicated below.

- 7.12: Appliances that are not intended to be immersed in water for cleaning are nevertheless required to be marked with a warning unless the test of 15.101 is withstood (USA).
- 7.12: The instruction that appliances intended to be used with a connector incorporating a thermostat must only be used with the appropriate connector, is required to be marked on the appliance (USA).
- 7.12: The instruction that cordless kettles are only to be used with the stand provided, is required to be marked on the appliance (USA).
- 11.2: Appliances are generally positioned against one wall and 100 mm away from the other wall of the test corner (USA).
- 11.7: The test durations are different (USA).
- 15.102: The test is not applicable (USA).
- 19.13: The criteria are different (USA).
- 19.101: The test is not applicable (Japan).
- 19.101: The test is not carried out if the thermal cut-out has been tested and found to be reliable (USA).
- 22.7: The test for pressure cookers is carried out at five times the maximum normal operating pressure or 2,5 times the release pressure of the safety device, whichever is greater (USA).
- 22.103: The test is different (USA).
- 22.104: The test is different (USA).
- 22.108: The force is different (USA).
- 22.109: The requirement is not applicable (USA).
- 24.1.3: A different number of cycles is specified (USA).
- 25.8: A supply cord having a cross-sectional area of 0,75 mm² is not allowed for appliances having a rated current exceeding 6 A (Japan and USA).
- 25.8: Longer supply cords are allowed (Japan).

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice.

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.

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.

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.

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 International Standard deals with the safety of electrical appliances for heating liquids for household and similar purposes, their **rated voltage** being not more than 250 V.

NOTE 101 Some appliances may be used for heating food.

NOTE 102 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;
- slow cookers;
- **steam cookers**;
- wash boilers;
- yoghurt makers.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are within the scope of this standard.

NOTE 103 Examples of such appliances are

- glue pots with a water jacket;
- livestock feed boilers;
- sterilizers.

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

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

NOTE 104 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- 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.

NOTE 105 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.

NOTE 106 Attention is drawn to the fact that in many countries requirements for pressure vessels are applied to pressure cookers.

2 Normative references

This clause of Part 1 is applicable.

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Replacement:

normal operation

operation of the appliance under the following conditions

3.1.9.101 Kettles and other appliances for boiling water, coffee-makers, 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**.

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.

3.101

rated capacity

capacity assigned to the appliance by the manufacturer

3.102

rated cooking pressure

pressure assigned to the appliance by the manufacturer

3.103

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 **Espresso coffee-makers** may have an outlet for supplying steam or hot water.

3.104

feeding-bottle heater

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

3.105

pressure regulator

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

3.106

pressure-relief device

control that limits the pressure under abnormal operating conditions

3.107

cordless kettle

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

3.108

steam cooker

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

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.2 Addition:

NOTE 101 If the test of 15.101 has to be carried out, three additional samples are required.

5.3 Addition:

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

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 their **rated capacity** or withstand the test of 15.2 when filled completely. 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 kettles** shall be marked with

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

7.12 Addition:

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 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 may be ejected.

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

- **WARNING:** Position the lid so that steam is directed away from the handle.

NOTE 101 The warning is not required if the lid can only be closed so that steam is directed away from the handle.

- **WARNING:** Do not remove the lid while the water is boiling.

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

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

CAUTION: Insure that the kettle 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 appliances normally cleaned after use, and not intended to be immersed in water for cleaning, shall state that the appliance must not be immersed.

NOTE 102 This requirement normally applies to coffee-makers, cooking pans, milk heaters, pressure cookers, **steam cookers**, slow cookers and yoghurt makers.

The instructions for 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. They 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 pricker.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.2 Addition:

NOTE 101 Connecting devices in stands of **cordless kettles** 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.

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 Addition:

Portable appliances are tested away from the walls of the test corner.

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**.*

11.6 Addition:

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

11.7 Replacement:

Appliances are operated for the duration specified in 11.7.101 to 11.7.105.

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 appliances for boiling water other than kettles, cooking pans, egg boilers, **feeding-bottle heaters**, glue pots, livestock feed boilers, milk heaters, sterilizers and wash boilers, 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, **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 Espresso coffee-makers are operated in accordance with the instructions, the coffee filter being filled with the maximum quantity of coffee of the type specified. 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 **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.

NOTE 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.

11.8 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**.*

12 Void

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:

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

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 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 kettles**, the test with the kettle on the horizontal plane is carried out with the kettle 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.*

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.

NOTE 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 kettles** 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 from a height of 200 mm. The solution is poured steadily through a tube having an inner diameter of 8 mm over a period of 2 s.

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

16 Leakage current and electric strength at operating temperature

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.*

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.

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:

*Pressure regulators of pressure cookers are rendered inoperative together with each **protective device** in turn.*

19.7 Addition:

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

19.13 Addition:

*During the test of 19.4, **pressure-relief devices** of pressure cookers shall operate before the pressure has reached 350 kPa.*

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 is short circuited and the kettle is operated empty at 0,85 times **rated power input** or 1,15 times **rated power input**, whichever is more unfavourable.*

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

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

NOTE 1 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.

NOTE 2 Subclause 19.13 is not applicable.

19.102 *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 °C ± 5 °C. After 1 min, the kettle is emptied.*

The test is carried out 100 times.

NOTE Subclause 19.13 is applicable.

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.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

Addition:

NOTE 101 Breakage of glass parts is neglected provided that compliance with 8.1, 15.1 and 15.101 is not impaired.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 Addition:

Drain holes shall be at least 5 mm in diameter or 20 mm² in area with a width of at least 3 mm.

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 any valve for the supply of steam closed. The maximum pressure attained is measured. The appliance is then subjected to twice the measured pressure for 5 min.

NOTE 101 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.

NOTE 102 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.

NOTE 103 Adequate safeguards have to be taken to avoid risks due to explosion.

*The appliance shall not rupture, there shall be no leakage other than through a self-resetting **pressure-relief device** and 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 regulators** and **pressure-relief devices** of pressure cookers are rendered inoperative and the lid is closed. The pressure is gradually increased hydraulically to six times the **rated cooking pressure**. The container shall not rupture.

22.101 Kettles shall be constructed so that the lid does not fall off when water is poured out.

Compliance is checked by the following test.

*The kettle is filled to its **rated capacity** and the lid closed in accordance with the instructions. The kettle is supplied at **rated voltage** and operated until the water boils. Approximately 90 % of the water is poured from the kettle in the normal way. The lid shall not fall off and water shall only be emitted from the spout.*

22.102 Kettles shall be constructed so that there are no sudden jets of steam or hot water likely to expose the user to a hazard when the appliance is used as in normal use.

NOTE Normal use takes into account the instructions concerning the position of the lid and the likely position of the user's hands when gripping the handle.

Compliance is checked by inspection during the test of Clause 11.

22.103 The appliance coupler of **cordless kettles** shall be constructed to withstand the stresses occurring during normal use.

Compliance is checked by the following test.

*The two live pins of the kettle are connected together and an external resistive load is connected in series with the supply. The external load is such that the current is 1,1 times **rated current**.*

The kettle is placed on its stand and withdrawn 10 000 times at a rate of approximately 10 times per minute. The test is continued for a further 10 000 times without current flowing.

After the test, the kettle shall be suitable for further use and compliance with 8.1, 16.3, 27.5 and Clause 29 shall not be impaired.

The test is carried out without current flowing if the connection contacts cannot make or break on load.

22.104 **Portable appliances** for boiling water that have a **rated capacity** exceeding 3 l, and which are liable to overturn, shall be constructed so that the rate of discharge is limited.

Compliance is checked by the following test, appliances incorporating an appliance inlet being fitted with a cord set.

*The appliance is filled with water to its **rated capacity** and the lid closed in accordance with the instructions. It is placed on a horizontal plane in any position of normal use but orientated to produce the most unfavourable result.*

The plane is slowly inclined to an angle of 25°. If the appliance overturns, it is left in this position for 10 s and then returned to its normal position. The quantity of water remaining is measured. The rate of discharge of water is determined from the formula:

$$D = \frac{60 (C_1 - C_2)}{t}$$

where

D is the rate of discharge of water;

C_1 is the **rated capacity** in litres;

C_2 is the remaining quantity of water in litres;

t is the duration of the discharge in seconds, measured from the time the appliance overturns.

The rate of discharge of water shall not exceed 16 l/min.

NOTE Suitable means may be used to prevent the appliance from slipping on the inclined plane.

22.105 Fixed appliances for boiling water shall be constructed so that the container is always open to the atmosphere through an aperture of at least 5 mm in diameter, or 20 mm² in area with a width of at least 3 mm. The aperture shall be located so that it is unlikely to be obstructed in normal use.

If the appliance has provision for discharging steam or for water overflow, the discharge aperture shall be at the base of the appliance and shall discharge vertically downwards.

Compliance is checked by inspection and by measurement.

22.106 Espresso coffee-makers shall be constructed so that it is not possible to remove the coffee filter by a simple operation while there is a hazardous pressure within the container.

NOTE This requirement is considered to be met if the coffee filter can only be removed after it has been rotated through an angle of at least 30°.

Compliance is checked by inspection and by manual test.

22.107 Pressure cookers shall incorporate a non-self-resetting pressure or temperature responsive **pressure-relief device**.

Compliance is checked by inspection.

22.108 Pressure cookers shall be constructed so that the lid cannot be removed while the pressure within the container is excessive. They shall incorporate a means to release the pressure to a value such that the lid can be removed without risk.

Compliance is checked by the following test.

The pressure cooker is operated as specified in Clause 11 until the **pressure regulator** operates for the first time.

The pressure cooker is then disconnected from the supply and the pressure allowed to decrease until the pressure is 4 kPa. A force of 100 N is applied to the most unfavourable point where the lid or its handle can be gripped. It shall not be possible to remove the lid.

The internal pressure is then gradually reduced, the force of 100 N being maintained. There shall be no hazardous displacement of the lid when it is released.

This test is not carried out on pressure cookers when the lid is secured by screw clamps or other devices that ensure that the pressure is automatically reduced in a controlled manner before the lid can be removed.

22.109 Feeding-bottle heaters shall emit a visible or audible signal to indicate that the heating period is terminated.

Compliance is checked by inspection during the test of Clause 11.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 Addition:

Switches incorporated in **espresso coffee-makers** for initiating brewing or steaming are subjected to 10 000 cycles of operation.

24.1.4 Addition:

Self-resetting thermal cut-outs required for compliance with the test of 19.101 are subjected to 3 000 cycles of operation.

24.1.5 Addition:

For appliance couplers incorporating **thermostats**, **thermal cut-outs** or fuses in the connectors, IEC 60320-1 is applicable except that

- the earthing contact of the connector is allowed to be accessible, provided that this contact is not likely to be gripped during insertion or withdrawal of the connector;
- the temperature required for the test of Clause 18 is that measured on the pins of the appliance inlet during the test of Clause 11 of this standard;
- the breaking-capacity test of Clause 19 is carried out using the inlet of the appliance;
- the temperature rise of current-carrying parts specified in Clause 21 is not determined.

NOTE 101 Thermal controls are not allowed in connectors complying with the standard sheets of IEC 60320-1.

24.4 Addition:

NOTE 101 This requirement is not applicable to the connection between the kettle and the stand of **cordless kettles**.

24.101 Devices incorporated in appliances, other than kettles, for compliance with 19.4, shall be non-self resetting. However, **self-resetting thermal cut-outs** are allowed for **fixed water boilers** if they have been subjected to 10 000 cycles of operation.

Compliance is checked by inspection and during the test of 19.4.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 Addition:

Appliances incorporating an appliance inlet, other than those standardized in IEC 60320-1, shall be supplied with a cord set.

25.5 Addition:

Type Z attachment is allowed for egg boilers, **feeding-bottle heaters**, steam sterilizers, yoghurt makers and stands of **cordless kettles**.

25.7 Addition:

The **supply cord** of livestock feed boilers shall be polychloroprene sheathed.

25.8 Addition:

Portable appliances having a **rated current** up to 10 A may incorporate a **supply cord** having a nominal cross-sectional area of 0,75 mm², if the length is less than 2 m.

25.101 Supply cords of kettles shall not be longer than 75 cm, unless they are helically coiled.

Compliance is checked by measurement.

*If a **cordless kettle** has a cord storage facility, the length of the cord is measured after storing as much of the cord as possible.*

NOTE The length of the cord is measured between the plug and the point where the cord or cord guard enters the appliance.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

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 if the insulation can be polluted by condensation from steam produced during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.1 Addition:

*For coffee-makers, egg boilers, kettles and **steam cookers**, the temperature rises occurring during the tests of 19.4, 19.5 and 19.101 are not taken into account.*

30.2 Addition:

For water distillers and appliances intended to maintain liquid or food at a particular temperature, 30.2.3 is applicable. For other appliances, 30.2.2 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Withdrawing
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