

INTERNATIONAL
STANDARD

IEC
60335-2-14

Fourth edition
2002-10

**Household and similar electrical appliances –
Safety –**

**Part 2-14:
Particular requirements for kitchen machines**

*Appareils électrodomestiques et analogues –
Sécurité –*

*Partie 2-14:
Règles particulières pour les machines de cuisine*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –**

Part 2-14: Particular requirements for kitchen machines

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

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

This fourth edition cancels and replaces the third edition published in 1994 and its amendments 1 (1999) and 2 (1999). It constitutes a technical revision.

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

FDIS	Report on voting
61/2180/FDIS	61/2261/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 electric kitchen machines.

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.

- 3.1.9: Different loads are used (USA).
- 6.1: Hand-held kitchen machines shall be class II or class III. Other machines shall be class I, class II or class III (France, Netherlands and Norway).
- 11.7: The operating times are different (USA).
- 19.7: The test is applicable to all appliances and the tests of 19.101 and 19.102 are not applicable (USA).
- 20.108: The guarding requirements are different and warnings may be marked on the appliance instead (USA).
- 20.110 Larger openings are allowed but the cutting blades shall be located further away from the openings (USA).
- 20.112: The stopping time allowed is 4 s (Brazil, Canada and USA).
- 25.5: Type Z attachment is allowed for all appliances (USA).
- 25.7: PVC cords are not allowed for ice-cream machines in refrigerators (Norway).

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

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 2-14: Particular requirements for kitchen machines

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric kitchen machines for household and similar purposes, their **rated voltage** being not more than 250 V.

NOTE 101 Examples of appliances that are within the scope of this standard are

- bean slicers;
- berry-juice extractors;
- blenders;
- can openers;
- centrifugal juicers;
- churns;
- citrus-fruit squeezers;
- coffee mills not exceeding 500 g hopper capacity;
- cream whippers;
- egg beaters;
- **food mixers**;
- **food processors**;
- grain grinders not exceeding 3 l hopper capacity;
- graters;
- ice-cream machines, including those for use in refrigerators and freezers;
- knife sharpeners;
- knives;
- **mincers**;
- noodle makers;
- potato peelers;
- shredders;
- sieving machines;
- slicing machines.

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.

As far as is practicable, this standard deals with the common hazards presented by appliances which 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 102 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 and similar authorities.

NOTE 103 This standard does not apply to

- slicing machines having a circular knife the blade of which is inclined at an angle exceeding 45° to the vertical;
- food waste disposers (IEC 60335-2-16);
- ice-cream appliances with incorporated motor compressors (IEC 60335-2-24);
- kitchen machines intended for commercial purposes (IEC 60335-2-64);
- kitchen machines intended for industrial purposes;
- kitchen machines intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60811-1-4:1985, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section Four – Tests at low temperature*

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Replacement:

normal operation

operation of the appliance under the conditions specified in 3.1.9.101 to 3.1.9.119, or at **rated power input** if this is more unfavourable

NOTE 101 If the conditions are not specified, the appliance is operated with the most unfavourable load indicated in the instructions.

NOTE 102 **Rated power input** is obtained by applying a constant torque to the appliance placed in its normal position of use and without subjecting it to imbalance forces greater than those occurring in normal use.

NOTE 103 Operation at **rated power input** is considered to be more unfavourable if the power input determined during the test of 10.1 differs from the **rated power input** by more than

- –20 % for appliances having a **rated power input** not exceeding 300 W;
- –15 % (or –60 W if greater) for appliances having a **rated power input** exceeding 300 W.

3.1.9.101 Berry-juice extractors are fed with 1 kg of berries, such as currants, gooseberries or grapes. Pushers are pressed with a force of 5 N against the berries.

3.1.9.102 Blenders are operated with the bowl filled to its maximum indicated level with a mixture comprising two parts by mass of soaked carrots and three parts water. If this level is not indicated, the bowl is filled to two-thirds of its total capacity. The carrots are soaked in water for 24 h and cut so that the dimensions of the pieces do not exceed 15 mm. If the bowl is not provided, a cylindrical bowl is used which has a capacity of approximately 1 l and an inner diameter of approximately 110 mm.

Blenders for liquid are operated with water instead of the mixture.

3.1.9.103 Can openers are operated with cans of tinned steel having a diameter of approximately 100 mm.

3.1.9.104 Centrifugal juicers are operated with carrots that have been soaked in water for approximately 24 h. 5 kg of soaked carrots are gradually fed into juicers having separate outlets for the juice and residue. Other juicers are fed with batches of 0,5 kg of carrots, unless otherwise indicated in the instructions. Pushers are pressed with a force of 5 N against the carrots.

3.1.9.105 Cheese graters are operated with a 250 g piece of hard Parmesan cheese selected from a block of cheese about 16 months old and which has at least one plane surface. A force of 10 N is applied to the cheese unless the force is applied automatically.

3.1.9.106 Churns are filled with a mixture of eight parts by mass of heavy cream and one part of buttermilk. The quantity of the mixture is the maximum that allows the churn to operate without spillage.

3.1.9.107 Citrus-fruit squeezers are operated with orange halves pressed against the reamer with a force of 50 N.

3.1.9.108 Coffee mills having a separate container for collecting the ground coffee are operated with the hopper filled with roasted coffee beans.

Other coffee mills are operated with the hopper filled with the maximum quantity of roasted coffee beans stated in the instructions.

NOTE If necessary, the coffee beans are conditioned for 24 h at a temperature of $30\text{ °C} \pm 2\text{ °C}$ and a relative humidity of $(60 \pm 2)\%$.

Controls are set to the position resulting in the smallest grain size.

3.1.9.109 Cream whippers and egg beaters are operated in water with 80 % of the length of the effective part immersed in a bowl of water.

3.1.9.110 Food mixers with beaters for mixing cake batter are operated with the beater blades as close as possible to the bottom of a bowl containing dry sand having a grain size between 170 μm and 250 μm . The height of the sand in the bowl is approximately 80 % of the length of the effective part of the beater.

Food mixers with kneaders for mixing yeast dough are operated with the kneaders in a bowl filled with a mixture of flour and water.

NOTE 1 The flour has a protein content of $(10 \pm 1)\%$, based on a negligible water content of the flour and without chemical additives.

NOTE 2 In case of doubt, the flour is to be more than two weeks but less than four months old. It is to be stored in plastic bags with as little air as possible.

The bowl is filled with a mass of flour in grams equal to 35 % of its capacity in cm^3 , 72 g of water at a temperature of $25\text{ °C} \pm 1\text{ °C}$ being added for each 100 g of flour.

NOTE 3 In case of doubt, the quantity of water is 1,2 times that necessary for the consistency of the mixture to be 500 Brabender units at $29\text{ °C} \pm 1\text{ °C}$, measured using a farinograph.

For **hand-held food mixers**, the kneaders are moved in a figure-of-eight movement at a rate of 10 to 15 movements per minute. The kneaders are to touch the wall of the bowl at opposite points and be in contact with the bottom of the bowl. If a bowl is not provided, a bowl is used that has a height of approximately 130 mm and an inner diameter of approximately 170 mm at the top, tapering down to approximately 150 mm at the bottom. Its inner surface is smooth and the wall and bottom blend smoothly.

3.1.9.111 Food processors are operated as specified for **food mixers** with kneaders for mixing yeast dough. However, the quantity of the mixture is the maximum stated in the instructions. If an accessory rotating at high speed is used to prepare the dough, only 60 g of water is used for each 100 g of flour.

NOTE 1 In case of doubt when using an accessory rotating at high speed, the quantity of water is that necessary for the consistency of the mixture to be 500 Brabender units at $29\text{ °C} \pm 1\text{ °C}$, measured using a farinograph.

NOTE 2 If instructions for mixing yeast dough are not provided, the **food processor** is operated using the recipe which results in the most unfavourable conditions.

3.1.9.112 Grain grinders are operated with the hopper filled with wheat, controls being set to the position resulting in the smallest grain size.

NOTE 1 If necessary, the wheat is conditioned for 24 h at a temperature of $30\text{ °C} \pm 2\text{ °C}$ and a relative humidity of $(60 \pm 2)\%$.

NOTE 2 Corn is used instead of wheat when instructions state that it can be ground.

3.1.9.113 Ice-cream machines are operated with a mixture of 60 % water, 30 % sugar, 5 % lemon juice and 5 % beaten egg white by mass. The quantity of the mixture is the maximum stated in the instructions.

Removable elements for cooling ice cream are pre-cooled for 24 h at $-20\text{ °C} \pm 5\text{ °C}$.

For appliances cooled by ice, the cooling container is filled with ice in accordance with the instructions, 200 g of salt being added for each kg of ice.

Ice-cream machines for use in refrigerators and freezers are placed on thermal insulating material approximately 20 mm thick. They are operated without load at an ambient temperature of $-4\text{ °C} \pm 1\text{ °C}$.

3.1.9.114 Knives are operated by slicing a length of hard sausage when measuring the power input. The sausage is approximately 55 mm in diameter and cut into slices approximately 5 mm thick, a force of approximately 10 N being applied to the knife. The sausage is stored for at least 4 h at a temperature of $23\text{ °C} \pm 2\text{ °C}$ before slicing.

NOTE Salami is a suitable hard sausage.

For the other tests, knives are operated with the cutting edge of the blade pressed against a length of soft wood having a cross-section approximately 50 mm × 100 mm. A force is gradually applied to the knife until the power input measured when cutting the sausage is obtained.

3.1.9.115 Mincers are fed with sinewless, boneless and fatless beef that has been cut into pieces approximately 20 mm x 20 mm x 60 mm. Pushers are pressed with a force of 5 N against the meat.

NOTE A brake may be used to apply the mean value of the load that is determined by mincing the meat for 2 min.

3.1.9.116 Noodle makers are fed with dough prepared from 225 g wheat flour, 1 egg (approximately 55 g), 15 ml cooking oil and 45 ml water. Pushers are pressed with a force of 5 N against the dough.

3.1.9.117 Potato peelers of the container type are operated filled with water and potatoes. 5 kg of approximately spherical potatoes are used, each kilogram containing 12 to 15 potatoes.

Hand-held potato peelers are operated by peeling potatoes.

3.1.9.118 Vegetable graters and shredders are operated with carrots that have been soaked in water for approximately 24 h and cut into suitable pieces. Five batches, each containing 0,5 kg of soaked carrots, are used. Pushers are pressed with a force of 5 N against the carrots.

3.1.9.119 Bean slicers, knife sharpeners, sieving machines and slicing machines are operated without load.

3.101

food mixer

appliance intended for mixing food ingredients

3.102

food processor

appliance intended to finely chop batches of meat, cheese, vegetables and other foods by means of cutting blades rotating in a container

NOTE Other functions may be performed by rotating blades, disks, paddles, or similar means used in place of the cutting blades.

3.103

mincer

appliance intended to finely cut meat and other foods by the action of a feed screw, knives and perforated screens

3.104

biased-off switch

switch that automatically returns to the **off position** when its actuating member is released

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 Three additional coffee mills and grain grinders are required for the test of 19.102.

NOTE 102 The additional test of 25.14 is carried out on a separate appliance.

5.6 Modification:

Speed controls are adjusted in accordance with the instructions.

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Modification:

Appliances shall be marked with their **rated power input**.

7.12 Addition:

The instructions shall include the operating times and speed settings for accessories.

The instructions for slicing machines with a base having a plane surface underneath the sliding feed table shall include the substance of the following:

This appliance must be used with the sliding feed table and the piece holder in position unless this is not possible due to the size or shape of the food.

The instructions for **food processors** shall warn against misuse. They shall state that care is needed when handling cutting blades, especially when removing the blade from the bowl, emptying the bowl and during cleaning.

The instructions for **hand-held blenders** shall include the substance of the following:

- always disconnect the blender from the supply if it is left unattended and before assembling, disassembling or cleaning;
- do not allow children to use the blender without supervision.

Accessories, other than those supplied with the appliance, shall include instructions for their safe use.

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor-operated appliances

This clause of Part 1 is 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.

11.7 Replacement:

The appliance is operated for the period specified. However, if this period exceeds that stated in the instructions and if the temperature rise limits of Table 3 are exceeded, the test is carried out with the maximum quantity of ingredients stated in the instructions as follows:

- *twice the maximum period stated in the instructions, for specified operating periods not exceeding 1 min;*
- *the maximum period stated in the instructions plus 1 min, for specified operating periods exceeding 1 min, but not exceeding 7 min;*
- *the maximum period stated in the instructions, for specified operating periods exceeding 7 min.*

If it is necessary to perform a number of operations to obtain these periods, the rest periods are equal to the time taken to empty and refill the container.

Appliances incorporating a timer are operated for the maximum period allowed by the timer.

11.7.101 *Bean slicers, churns, sieving machines and slicing machines are operated for 30 min.*

11.7.102 *Berry-juice extractors, **mincers** and noodle makers are operated for 15 min.*

11.7.103 *Blenders that have to be kept switched on by hand and **hand-held blenders** are operated for 1 min with the control adjusted to the highest setting. The operation is carried out five times with rest periods of 1 min during which the mixture is replaced.*

For other blenders, the period of operation is 3 min, the operation being carried out 10 times.

11.7.104 *Can openers are operated until the can is fully open. This operation is carried out five times with rest periods of 15 s.*

11.7.105 *Centrifugal juicers having separate outlets for the juice and residue are operated for 30 min.*

Other centrifugal juicers are operated for 2 min. The operation is carried out 10 times with rest periods of 2 min.

11.7.106 *Cheese graters are operated until the cheese is grated.*

11.7.107 *Citrus-fruit squeezers are operated for 15 s during which two halves of fruit are squeezed. The operation is carried out 10 times with rest periods of 15 s.*

NOTE 1 The appliance is left idling during the rest periods unless it switches off automatically.

NOTE 2 If necessary, fruit residue is removed during the rest periods.

11.7.108 *Coffee mills having a separate container for collecting the ground coffee are operated until the container is full, unless the hopper is emptied first. This operation is carried out twice with a rest period of 1 min.*

Other coffee mills are operated until the coffee beans are completely ground or for 30 s if this is longer. The operation is carried out three times with rest periods of 1 min.

11.7.109 *Cream whippers and egg beaters are operated for 10 min with the control adjusted to the highest setting.*

11.7.110 **Food mixers** with beaters for mixing cake batter are operated for 15 min unless they incorporate a **biased-off switch**, in which case they are operated for 5 min.

Food mixers with kneaders for mixing yeast dough are operated for

- 5 min for **hand-held food mixers**;
- 10 min for **other food mixers**.

For the first 30 s the control is adjusted to the lowest setting, after which the control is adjusted to the position for mixing yeast dough stated in the instructions.

NOTE If the mixing action automatically stops when the dough is ready, the test is terminated.

11.7.111 **Food processors** are operated with the setting of the control and for the period stated in the instructions for mixing yeast dough. This operation is carried out five times or for a sufficient number of times to process at least 1 kg of flour, whichever is less. However, at least two operations are performed, with a rest period of 2 min between each operation.

*If instructions for mixing yeast dough are not provided, the **food processor** is operated under the most unfavourable conditions stated in the instructions. The operation is carried out three times.*

11.7.112 *Grain grinders are operated until 1 kg of wheat has been ground. The hopper of batch-fed grinders is refilled if necessary, with rest periods of 30 s.*

11.7.113 *Ice-cream machines for use in refrigerators and freezers are operated for 5 min, after which the stirrer is stalled for 25 min.*

Other ice-cream machines are operated for 30 min.

11.7.114 *Knife sharpeners are operated for 10 min.*

11.7.115 *Knives are operated for 15 min. The slicing operation is simulated at a rate of 10 slices per minute, the blades being unloaded for 2 s each time.*

11.7.116 *Potato peelers of the container type are operated until the potatoes are adequately peeled. Potatoes may be peeled in more than one batch. Peeling periods are separated by rest periods for 2 min.*

NOTE 1 When checking that the potatoes are adequately peeled, eyes are ignored.

NOTE 2 Timers are reset if necessary.

Hand-held potato peelers are operated for 10 min.

11.7.117 *Shredders and vegetable graters are operated until a batch of carrots is shredded. The operation is carried out five times with rest periods of 2 min.*

11.8 *Modification:*

For ice-cream machines for use in refrigerators and freezers, the temperature rise values are increased by 30 K.

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 *Modification:*

Instead of overfilling the liquid container, the test is carried out as follows.

*The liquid container of the appliance is completely filled with water containing approximately 1 % NaCl. The appliance is then supplied at **rated voltage** and operated for 15 s. Lids are in position or removed, whichever is more unfavourable. During the test, the leakage current shall not exceed the values specified in Clause 13.*

Saline solution is then added to the liquid container until it is completely full again. A further quantity equal to 15 % of the capacity of the container or 0,25 l, whichever is greater, is poured in steadily over a period of 1 min.

Addition:

Water outlets for potato peelers are blocked.

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:

*The test of 19.7 is only applicable to berry-juice extractors, blenders for food, centrifugal juicers, churns, **food mixers, food processors**, ice-cream machines, **mincers**, and noodle makers.*

Coffee mills and grain grinders are also subjected to the tests of 19.101, and to 19.102 unless they have to be kept switched on by hand.

19.7 Addition:

*Berry-juice extractors, blenders for food, centrifugal juicers for fruit and vegetables, **food mixers, food processors**, and **mincers** are operated for 30 s.*

Coffee mills, grain grinders and noodle makers are tested for 5 min.

Churns and ice-cream machines are operated until steady conditions are established.

19.10 Addition:

The test is repeated with accessories in position but without additional load.

Coffee mills and grain grinders are only tested for 30 s.

19.101 *Coffee mills and grain grinders are supplied at **rated voltage** and operated under **normal operation** five times with 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 coffee mills of the grinding type and grain grinders, 30 s longer than the time needed to fill the collecting container or the time required to empty the hopper, whichever is shorter;*
 - *for 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.

19.102 *Coffee mills and grain grinders are subjected to the following test that is carried out on three additional appliances.*

*Coffee mills are filled with 40 g of coffee beans to which are added two granite chips that pass through an 8 mm screen but not a 7 mm screen. Grain grinders are operated under **normal operation** but with two granite chips that pass through a 4 mm screen but not a 3 mm screen. The appliance is supplied at **rated voltage** and operated until grinding has been completed.*

If any of the motors stall, the original appliance is subjected to the test of 19.7.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 Addition:

Detachable accessories are removed and covers are opened except that for

- centrifugal juicers, the cover and the container for collecting the residue are in position;
- graters and shredders, this is only applicable to accessories that are removed while the appliance is in operation.

NOTE 101 A feed pusher is an example of an accessory that is removed.

The test probe is not applied to

- bean slicers;
- can openers;
- citrus juice squeezers;
- **food mixers**;
- **hand-held blenders**;
- ice-cream machines, including those for use in refrigerators and freezers;
- knife sharpeners;
- knives;
- potato peelers;
- sieving machines;
- slicing machines;
- the following parts of other appliances:
 - smooth shafts having a diameter not exceeding 8 mm, rotating at a speed not exceeding 1 500 rev/min and driven by motors having an input not exceeding 200 W;
 - outlet sides of grating and shredding disks rotating at a speed not exceeding 1 500 rev/min;
 - projections from the surface of grinding disks, cones and similar parts having a height less than 4 mm.

NOTE 102 Accessible drive shafts that may not be in use when the appliance is in operation may be protected by means of a collar or by being positioned in a recess.

The test probe is not applied to feed openings having a throat with the following dimensions:

- *a height of at least 100 mm, measured from the upper edge of the cutting blade;*
- *an average of the maximum and minimum cross-sectional dimensions of the feed opening that does not exceed 65,5 mm;*
- *a maximum cross-sectional dimension of the feed opening that does not exceed 76 mm.*

*For blenders, **detachable parts**, except lids, are not removed. The test is carried out with a test probe similar to that of test probe B of IEC 61032 but having a circular stop face with a diameter of 125 mm instead of the non-circular face, the distance between the tip of the test finger and the stop face being 100 mm.*

20.101 Accessories for cream whippers, egg beaters and **hand-held food mixers** shall not have knife edges, unless a suitable guard prevents accidental contact with their rotating parts.

It shall not be possible to release beaters, kneaders and similar accessories of **hand-held food mixers** by pressing a button or a similar action while the accessory is rotating at a speed exceeding 1 500 rev/min.

Compliance is checked by inspection, by measurement and by manual test.

20.102 Blades of **hand-held blenders** shall be completely screened from above and shall not be able to touch a flat surface while rotating.

Compliance is checked by inspection and by applying a cylindrical rod from any position between the vertical and an angle of 45° to the upperside of the blending blade. The rod has a diameter of 8,0 mm ± 0,1 mm and unlimited length.

It shall not be possible to touch the blades with the end of the test rod.

20.103 **Hand-held blenders** shall incorporate a **biased-off switch**, its actuating member being positioned in a recess or otherwise guarded to prevent accidental operation.

NOTE This requirement does not apply to **hand-held food mixers** provided with a blender attachment.

Compliance is checked by applying a cylindrical rod, having a diameter of 40 mm and a hemispherical end, to the switch. The appliance shall not operate.

20.104 It shall not be possible to operate the cutting blades of blenders, other than **hand-held blenders**, while they are accessible.

Compliance is checked by the following test.

***Detachable parts** are removed. It shall not be possible to operate the appliance if the cutting blades can be touched with the test finger specified for blenders in 20.2.*

20.105 Centrifugal juicers shall be constructed so that covers do not open due to vibration.

Rotating parts shall be secured so that they are not liable to become loose during operation.

NOTE Fastening of screws and nuts in a direction opposite to the direction of rotation of the rotating parts is considered to be sufficient.

If parts rotate faster than 5 000 rev/min, **tools** for fastening them shall be such that covers can only be closed after the **tool** has been removed.

Teeth of grating disks shall have a height not exceeding 1,5 mm. Ejectors on filter drums shall not project by more than 4 mm.

A feed pusher that fills the throat of the hopper shall be provided.

Compliance is checked by inspection, by measurement and by manual test. A force of 5 N is applied to covers in the most unfavourable direction. They shall not open.

20.106 For appliances having a feed screw, the maximum cross-sectional dimension of the hopper, measured at least 100 mm from the upper edge of the feed screw, shall not exceed 45 mm. A feed pusher that fills the throat of the hopper shall be provided.

Compliance is checked by inspection and by measurement.

20.107 Slicing machines, other than **fixed appliances** and those having a **biased-off switch**, shall incorporate means to hold the appliance in place and allow it to be released after use.

NOTE 1 Suction cups are suitable means to hold the appliance in place.

Compliance is checked by the following test.

The slicing machine is fixed to a plain glass plate placed on a horizontal surface.

NOTE 2 The glass is prevented from sliding by a stop.

A force of 30 N is applied horizontally to the appliance along the plane of the knife at a point 10 mm below the upper surface of the base carrying the sliding feed table.

The machine shall not move on the glass plate.

20.108 Slicing machines shall incorporate a guard surrounding the circular knife, its open sector being no larger than required for using the appliance, as shown in Figure 101.

Knife guards shall be non-detachable unless the motor cannot be switched on after their removal. It shall not be possible to operate interlocks by means of test probe B of IEC 61032.

The angle of the upper part of the open sector (θ in Figure 102) shall not exceed 75°. However the angle may be increased to 90° if the exposed part of the knife exceeding 75° is screened from above.

The radial distance between the outer circumference of the knife and the knife guard (a in Figure 102) shall not exceed

- 2 mm, if the guard is flush with the plane of the knife;
- 3 mm, if the guard projects at least 0,2 mm beyond the plane of the knife.

NOTE 1 The distance between the plane of the knife and the projection of the guard is shown as b in Figure 102.

When the thickness of the slices is set to zero, the distance between the outer circumference of the knife and the plate that sets the thickness of the slices (c in Figure 102) shall not exceed 6 mm. At the upper and lower points of the open sector, the distance between the plate that sets the thickness of the slices and any other protecting part (e in Figure 102) shall not exceed 5 mm.

NOTE 2 If the distance “ e ” is shielded, the limit does not apply.

Additional guarding shall be provided if slices thicker than 15 mm can be cut.

NOTE 3 An extension of the upper end of the plate that sets the thickness of the slices or an extension of the knife guard are examples of additional guarding.

Slicing machines shall incorporate a sliding feed table with a hand rest, a thumb guard and a piece holder. The thumb guard shall screen the full height of the open sector and be constructed so that the other fingers remain at least 30 mm away from the knife (f in Figure 102). The distance between the plane of the thumb guard and the knife (d in Figure 102) shall not exceed 5 mm. At the end of the forward movement of the sliding feed table, the thumb guard shall project at least 8 mm beyond the outer circumference of the knife.

The piece holder shall allow small pieces of food to be sliced and shall be capable of holding food, for example by spikes having a height of approximately 1,5 mm. It shall have a length of at least 120 mm and a height of at least 70 mm and shall project at least 20 mm beyond the hand rest.

The support for the sliding feed table shall not be usable for supporting food if

- the knife has a diameter exceeding 170 mm, or
- the no-load speed of the knife exceeds 200 rev/min, or
- the **rated power input** exceeds 200 W.

Compliance is checked by inspection, by measurement and by manual test.

20.109 Slicing machines shall be constructed so that accidental operation of the appliance is prevented.

NOTE The requirement may be met by using a pull-on switch.

If a push-button, toggle, rocker or slide switch is used, the force necessary to actuate it shall be at least 2 N and the actuating member shall be recessed. However, the actuating member of a slide switch need not be recessed if the force is at least 5 N and is located so that unintentional actuation of the switch is unlikely.

Compliance is checked by inspection, by measurement and, for recessed actuating members, by applying a cylindrical rod, having a diameter of 40 mm and a hemispherical end, to the switch. The appliance shall not operate.

20.110 The cutting blades of bean slicers shall be at least 30 mm from the plane of the inlet opening. The length of the major and minor axis of the inlet and outlet openings shall not exceed 30 mm and 15 mm. However, the dimensions of the outlet openings are not limited if a finger cannot be drawn in and a piece of stiff paper is not cut when inserted into the outlet opening.

Compliance is checked by measurement and by manual test.

20.111 The rotating parts of graters and shredders shall be secured so that they are not liable to become loose during operation.

NOTE Fastening of screws and nuts in a direction opposite to the direction of rotation of the rotating parts is considered to be sufficient.

A feed pusher that fills the throat of the hopper shall be provided.

Compliance is checked by inspection and by manual test.

20.112 The cutting blade of **food processors** shall stop within 1,5 s after the lid has been opened or removed.

Compliance is checked by operating the appliance without load and at the highest speed.

20.113 The lid interlock of **food processors** 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.

20.114 Access to dangerous moving parts of **food processors** shall be prevented for all combinations of assembly of **detachable parts** that allow the motor to operate.

Compliance is checked by the following test.

Detachable parts are removed or assembled incorrectly in a manner that can occur in use, such as the incorrect location or misalignment of the parts.

A force not exceeding 5 N is applied to the parts in any direction and it shall not be possible to touch dangerous moving parts with test probe B of IEC 61032.

20.115 Knives shall incorporate a **biased-off switch** that is recessed or guarded to prevent accidental operation.

Compliance is checked by inspection and by applying a cylindrical rod, having a diameter of 40 mm and a hemispherical end, to the switch. The appliance shall not operate.

20.116 Centrifugal juicers for fruit and vegetables shall be constructed so that parts cannot become disengaged when the appliance is operated at high speed.

Compliance is checked by the following test that is carried out without load.

*The appliance with the lid removed is supplied at **rated voltage** with the control adjusted to give the highest speed. The appliance is operated 10 times.*

No part of the appliance shall become disengaged.

The appliance is operated again but with the lid in position. When the speed reaches its maximum value, an attempt is made to remove the lid. The test is carried out 10 times.

No part of the appliance shall become disengaged.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

Addition:

*This test is also carried out on **detachable parts** that are necessary for protection against mechanical hazards.*

22 Construction

This clause of Part 1 is applicable except as follows.

22.40 *Addition:*

Any switch controlling the motor shall also disconnect **electronic circuits**, the malfunction of which would impair compliance with this standard.

Compliance is checked during the tests of Clause 19.

22.101 Appliances shall be constructed so that lubricants are prevented from polluting food compartments.

Compliance is checked by inspection.

22.102 Appliances shall be constructed so that food or liquids are prevented from penetrating into places that could cause electrical or mechanical faults.

Compliance is checked by inspection.

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 *Modification:*

Switches incorporated in the following appliances are tested for 3 000 cycles of operation:

- *bean slicers;*
- *blenders for liquid;*
- *cheese graters;*
- *graters;*
- *ice-cream machines for use in refrigerators and freezers;*
- *sieving machines;*
- *shredders.*

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 *Addition:*

Ice-cream machines for use in refrigerators and freezers and **hand-held appliances** shall not incorporate an appliance inlet.

25.5 *Addition:*

Type Z attachment is allowed for

- can openers;
- coffee mills and grain grinders having a mass not exceeding 1,5 kg;

- cream whippers;
- egg beaters;
- ice-cream machines including those for use in refrigerators and freezers;
- knife sharpeners.

Type X attachments, other than those with a specially prepared cord, shall not be used for ice-cream machines for use in refrigerators and freezers.

25.7 Addition:

Polyvinyl chloride sheathed **supply cords** of ice-cream machines for use in refrigerators and freezers shall be resistant to low temperatures.

Compliance is checked by the tests of 8.1, 8.2 and 8.3 of IEC 60811-1-4, these tests being carried out at a temperature of $-25\text{ °C} \pm 2\text{ °C}$.

25.14 Addition:

Hand-held blenders and hand-held mixers are also subjected to the following test while mounted on an apparatus similar to that of Figure 8.

*The **supply cord** is suspended vertically from the appliance and loaded so that a force of 10 N is applied. The oscillating part is moved through an angle of 180° and back to the initial position. The number of flexings is 2 000, the rate of flexing being six per minute.*

NOTE 101 The appliance is mounted so that the direction of flexing corresponds to that most likely to occur when the **supply cord** is wound around it for storage.

25.22 Addition:

Appliance inlets shall be located so that pollution by food or liquid is unlikely to occur during normal use.

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 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.1 Modification:

For ice-cream machines for use in refrigerators and freezers, the temperature of 40 °C is replaced by 10 °C.

30.2 Addition:

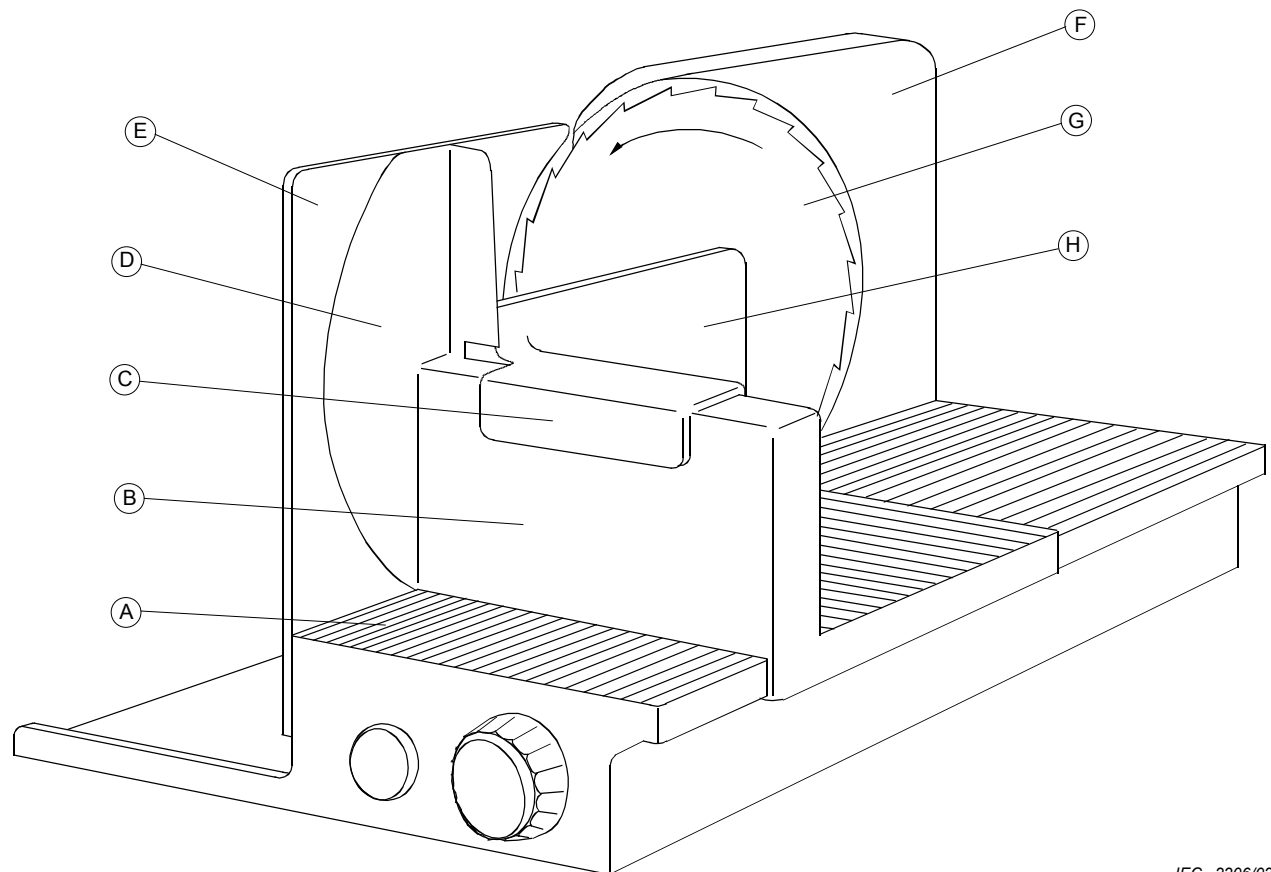
For churns and ice-cream machines, 30.2.3 is applicable. For other appliances, 30.2.2 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

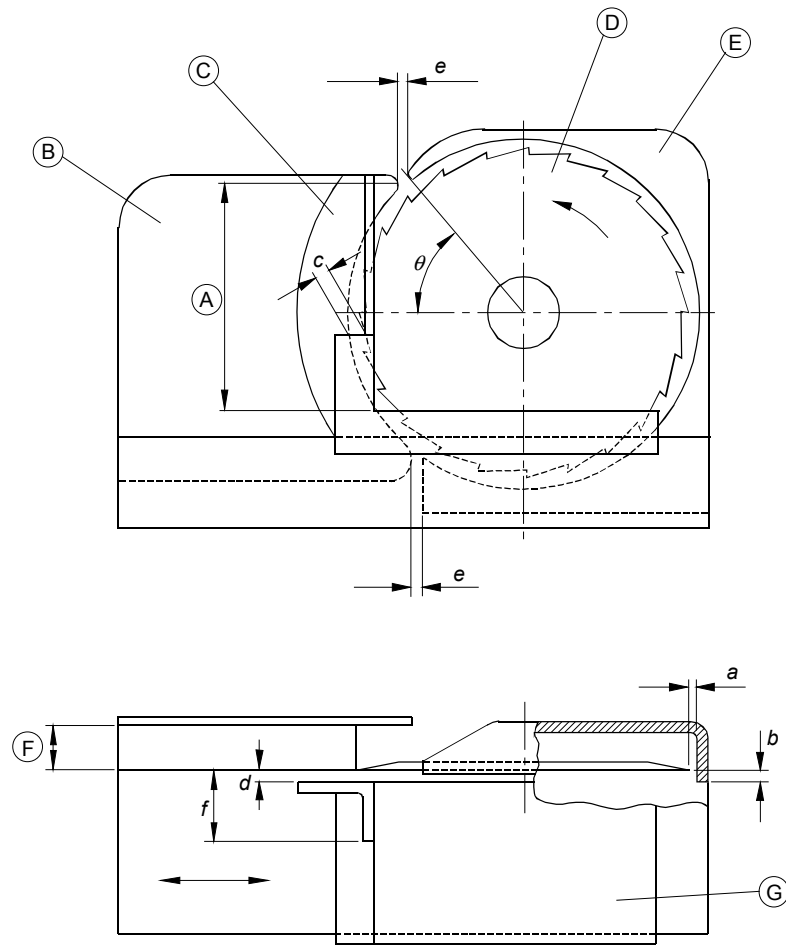


IEC 2206/02

Key

- A Support
- B Sliding feed table
- C Hand rest
- D Thumb guard
- E Plate that sets the thickness of the slices
- F Blade guard
- G Rotating blade
- H Piece holder

Figure 101 – Slicing machine



IEC 2207/02

Key

- A Full height of the open section
- B Plate that sets the thickness of the slices
- C Thumb guard
- D Rotating blade
- E Blade guard
- F Thickness of slices
- G Sliding feed table

NOTE The dimensions are explained in 20.108.

Figure 102 – Protecting devices for slicing machines

Annexes

The annexes of Part 1 are applicable except as follows.

Annex C (normative)

Aging test on motors

Modification:

The value of p in Table C.1 is 2 000, except for the following appliances for which it is 500:

- bean slicers;
- blenders;
- can openers;
- cheese graters;
- citrus-fruit squeezers;
- graters;
- ice-cream machines for use in refrigerators and freezers;
- knife sharpeners;
- knives;
- sieving machines;
- shredders.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60335-2-16, *Household and similar electrical appliances – Safety – Part 2-16: Particular requirements for food waste disposers*

IEC 60335-2-24, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers*

IEC 60335-2-64, *Household and similar electrical appliances – Safety – Part 2-64: Particular requirements for commercial electric kitchen machines*



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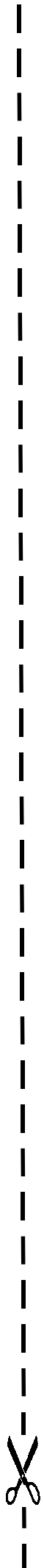
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