IS 302-2-14 : 2009
(Reaffirmed 2014)

भारतीय मानक

घरेलू और समान विद्युत साधित्रों की सुरक्षा

भाग 2 विशेष अपेक्षाएँ

अनुभाग 14 बिजली की रसोई मशीनें

(पहला पुनरीक्षण)

Indian Standard

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

PART 2 PARTICULAR REQUIREMENTS

Section 14 Electric Kitchen Machines

(First Revision)

ICS 97.040.50; 13.120

B U R E A U O F I N D I A N S T A N D A R D S
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Electrical Appliances Sectional Committee, ETD 32

FOREWORD

This Indian Standard (Part 2/Sec 14) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was first published in 1994. This revision has been undertaken primarily to align the existing standard with latest International Standard.

This standard covers the safety requirements of kitchen machines. This standard, however, does not cover the performance requirements which are covered under IS 4250 : 1980 'Domestic electric food mixers (liquidizers and grinders) (*first revision*)'.

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

This standard recognizes the International 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.

If the functions of an appliance are covered by different Parts and Sections of IS 302, the relevant Part and Section 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.

NOTE — Throughout this publication, wherever Part 2 is mentioned, it refers to the relevant Part of IS 302.

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.

Application of this standard, as far as is reasonable, may be considered to appliances not mentioned in Part 2, and to appliances designed on new principles.

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, which 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.

This standard is to be read in conjunction with IS 302-1 (2008) 'Safety of household and similar electrical appliances: Part 1 General requirements'. For the sake of convenience, the clauses of this standard correspond to those of IS 302-1: (2008), instead of reproducing full text of each clause, clauses of IS 302-1 (2008) which are applicable (which means that relevant provisions of the clause apply) or not applicable and the subclauses or portion thereof which are not applicable are indicated as under:

a) In case of a clause where it is applicable, the wording used is 'This clause of IS 302-1 (2008) is applicable/ not applicable'; and
b) In case of a subclause or part thereof 'Not applicable'.

Wherever a subclause of IS 302-1 (2008) is to be replaced by a new text, it has been indicated as under:

Replacement — followed by the new text.

Any addition to the existing provision of a subclause of IS 302-1 (2008) has been indicated as under:

Addition — followed by the text of the additional matter.

(*Continued to third cover*)

(*Continued from second cover*)

Clauses/tables which are additional to those of IS 302-1 (2008) are numbered starting from 101 and additional subclauses are numbered with the main clause number followed by 101, 102, etc, for example, **7.101**.

Should, however, any deviation exist between IS 302-1 (2008) and this standard, the provisions of the latter shall apply.

This standard is based on IEC 60335-2-14 (2006) 'Safety of household and similar electrical appliances — Part 2-14 : Particular requirements for kitchen machines' issued by the International Electrotechnical Commission except for the following modification:

a) The leakage current value is more stringent as compared to IEC Publication, and
b) Ambient test conditions are based on national conditions.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

PART 2 PARTICULAR REQUIREMENTS

Section 14 Electric Kitchen Machines

(First Revision)

1 SCOPE

This clause of Part 1 is replaced by the following.

This 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:

1) bean slicers;
2) berry-juice extractors;
3) blenders;
4) can openers;
5) centrifugal juicers;
6) churns;
7) citrus-fruit squeezers;
8) coffee mills not exceeding 500 g hopper capacity;
9) cream whippers;
10) egg beaters;
11) food mixers;
12) food processors;
13) grain grinders not exceeding 3 l hopper capacity;
14) graters;
15) ice-cream machines, including those for use in refrigerators and freezers;
16) knife sharpeners;
17) knives;
18) mincers;
19) noodle makers;
20) potato peelers;
21) shredders;
22) sieving machines; and
23) 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 that are encountered by all persons in and around the home. However, in general, it does not take into account:

a) the use of appliances by young children or infirm persons without supervision, and
b) playing with the appliance by young children.

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

a) for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary; and
b) 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:

a) slicing machines having a circular knife the blade of which is inclined at an angle exceeding 45° to the vertical;
b) food waste disposers;
c) ice-cream appliances with incorporated motor compressors (IS 302-2-24);
d) kitchen machines intended for commercial purposes;
e) kitchen machines intended for industrial purposes; and
f) 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 REFERENCES

This clause of Part 1 is applicable except as follows:

Addition

IS No.	*Title*
10810	Method of test for cables:
(Part 20) :1984	Cold bend test
(Part 21) :1984	Cold impact test

3 TERMINOLOGY

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.

NOTES

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

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.

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:

a) 20 percent for appliances having a rated power input not exceeding 300 W; and

b) 15 percent (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 litre 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. Five kilograms 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°C ± 2°C and a relative humidity of (60 ± 2) percent.

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 percent 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 mm^2 and 250 mm^2. The height of the sand in the bowl is approximately 80 percent 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 ± 1) percent, 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 percent of its capacity in cm^3, 72 g of water at a temperature of 27°C ± 1°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°C ± 1°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.

NOTES

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°C ± 1°C, measured using a Farinograph.

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.

NOTES

1 If necessary, the wheat is conditioned for 24 h at a temperature of 30°C ± 2°C and a relative humidity of (60 ± 2) percent.

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 percent water, 30 percent sugar, 5 percent lemon juice and 5 percent 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°C ± 5°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°C ± 1°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°C ± 2°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 × 20 mm × 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. Five kilograms 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 REQUIREMENTS

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

NOTES

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

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 shall 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:

a) Always disconnect the blender from the supply if it is left unattended and before assembling, disassembling or cleaning; and
b) 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.

7.101 BIS Certification Marking

The appliances may also be marked with the Standard Mark.

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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:

a) Twice the maximum period stated in the instructions, for specified operating periods not exceeding 1 min;
b) The maximum period stated in the instructions plus 1 min, for specified operating periods exceeding 1 min, but not exceeding 7 min; and
c) 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.

NOTES

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

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:

a) 5 min for hand-held food mixers, and
b) 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.

NOTES

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

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 percent sodium chloride (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 **13**.

Saline solution is then added to the liquid container until it is completely full again. A further quantity equal to 15 percent 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 **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 30s.

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:

a) for appliances incorporating a timer, the longest period allowed by the timer; and

b) for other appliances, as follows:

   1) 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; and

   2) for other coffee mills, 1 min.

The duration of the rest period is:

a) 10 s, for appliances provided with a collecting container; and

b) 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:

a) centrifugal juicers, the cover and the container for collecting the residue are in position; and

b) 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:

a) bean slicers;

b) can openers;

c) citrus juice squeezers;

d) food mixers;

e) hand-held blenders;

f) ice-cream machines, including those for use in refrigerators and freezers;

g) knife sharpeners;

h) knives;

j) potato peelers;

k) sieving machines;

m) slicing machines; and

n) the following parts of other appliances:

   1) 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;

   2) outlet sides of grating and shredding disks rotating at a speed not exceeding 1 500 rev/min; and

   3) 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) A height of at least 100 mm, measured from the upper edge of the cutting blade;
b) An average of the maximum and minimum cross-sectional dimensions of the feed opening that does not exceed 65.5 mm; and
c) 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 IS 1401 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 upper side 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 Fig. 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 IS 1401.

The angle of the upper part of the open sector (*f* in Fig. 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 Fig. 102) shall not exceed:

a) 2 mm, if the guard is flush with the plane of the knife; and
b) 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 Fig. 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 Fig. 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 Fig. 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 Fig. 102). The distance between the plane of the thumb guard and the knife (*d* in Fig. 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:

a) the knife has a diameter exceeding 170 mm, or
b) the no-load speed of the knife exceeds 200 rev/min, or
c) 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.

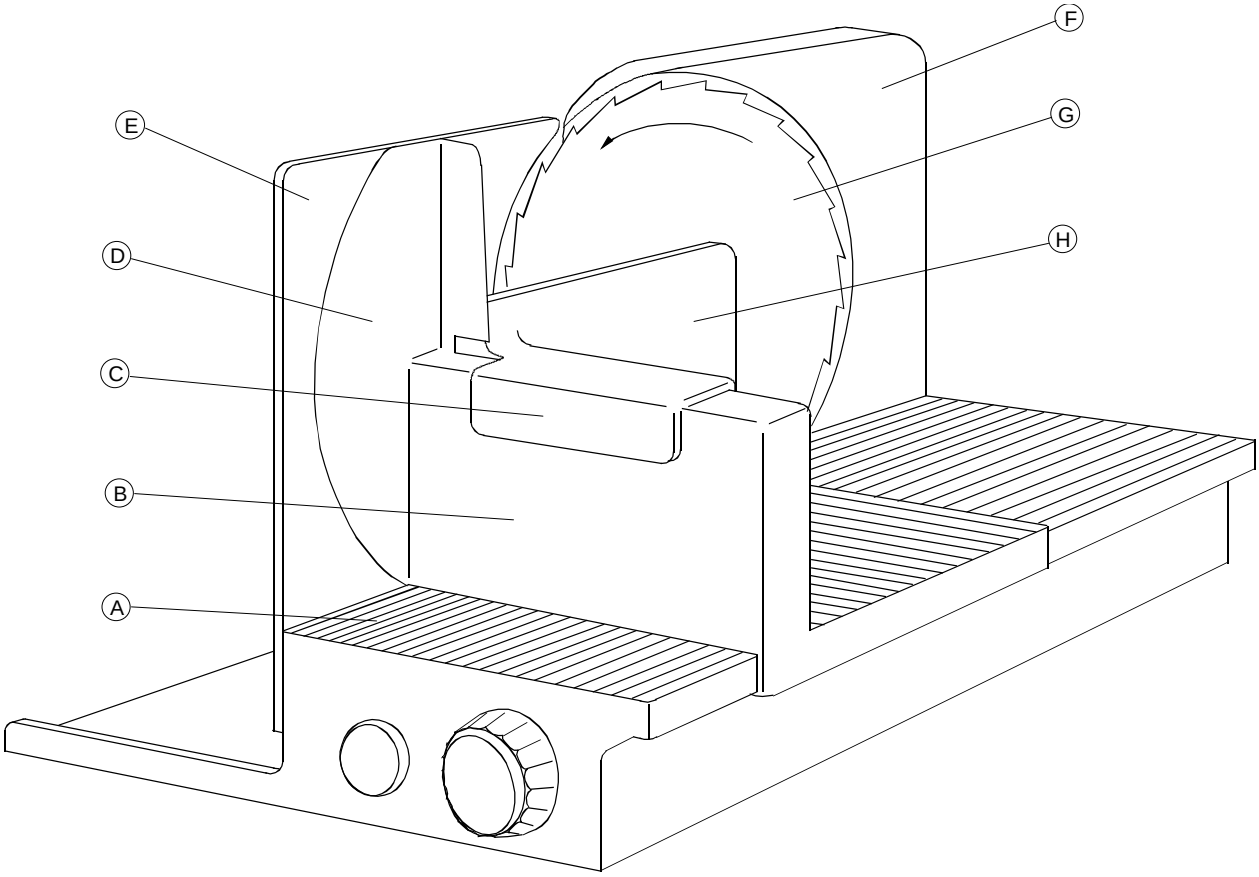
Compliance is checked by inspection and by manual test.

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.



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

FIG. 101 SLICING MACHINE

Compliance is checked by inspection, by manual test and by applying test probe B of IS 1401.

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 IS 1401.

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.

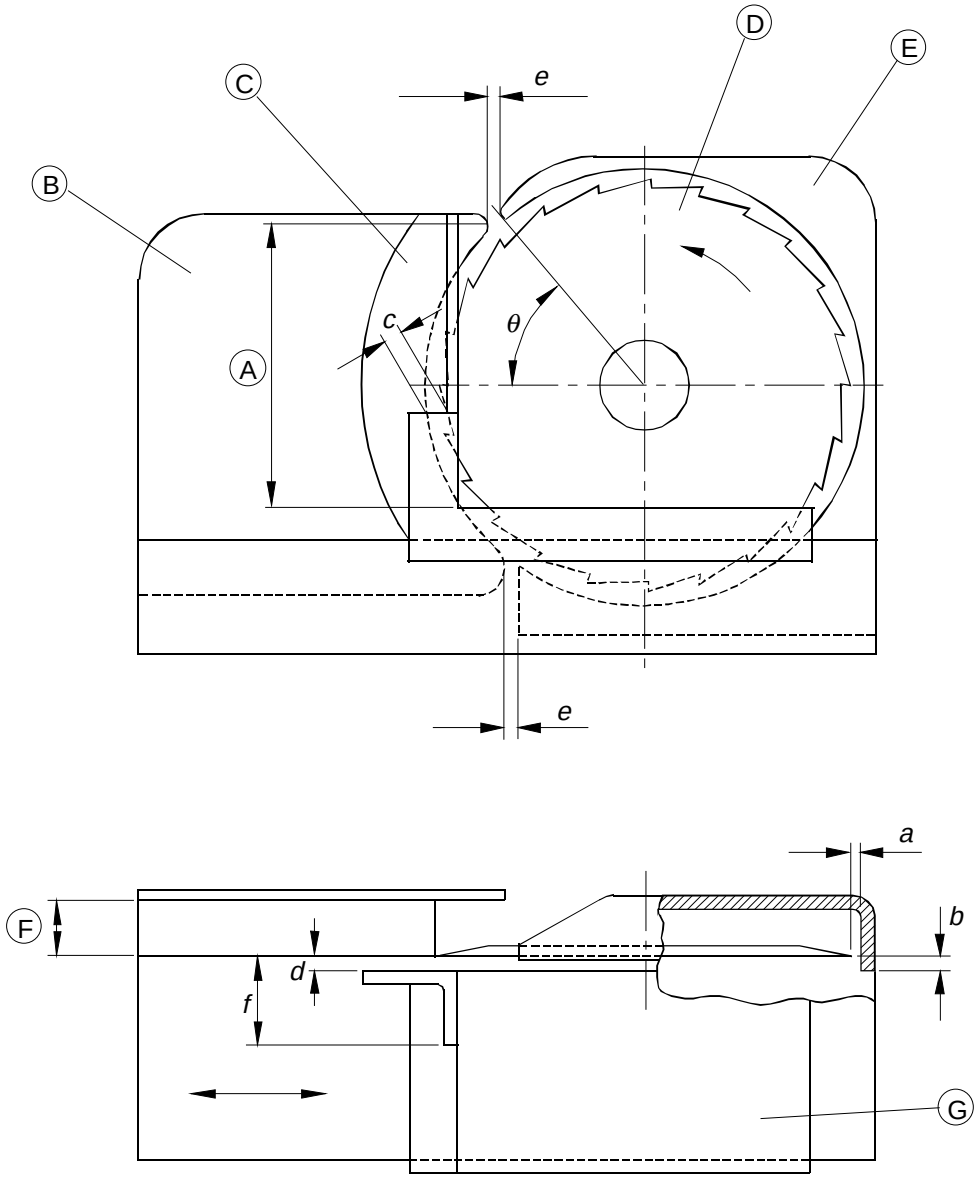
20.116 Centrifugal juicers for fruit and vegetables shall be constructed so that parts cannot become disengaged when the appliance is operated at high speed.

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.



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**.

FIG. 102 PROTECTING DEVICES FOR SLICING MACHINES

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 **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:

a) Bean slicers,
b) Blenders for liquid,
c) Cheese graters,
d) Graters,
e) Ice-cream machines for use in refrigerators and freezers,
f) Sieving machines, and
g) 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:

a) can openers,
b) coffee mills and grain grinders having a mass not exceeding 1.5 kg,
c) cream whippers,
d) egg beaters,
e) ice-cream machines including those for use in refrigerators and freezers, and
f) 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 IS 10810 (Part 20) and IS 10810 (Part 21), these tests being carried out at a temperature of –25°C ± 2°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 Fig. 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 flexing 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.

101 TESTS

101.1 Type Tests

The tests specified in Table 101 shall constitute the type tests and shall be carried out on a sample selected (*see* **5.3**). Before commencement of the tests, the irons preferably at random from regular production lot shall be visually examined and inspected of components, parts and their assembly, constructions, mechanical hazards, marking provision of suitable terminals for supply connections, earthing and the effectiveness screws and connection. The external surface finish shall be even and free from finishing defects.

Table 101 Schedule of Type Tests

(*Clause* 101.1)

Sl No. (1)	Tests (2)	Clause Reference (3)
i)	Protection against access to live parts	**8**
ii)	Power input and current	**10**
iii)	Heating	**11**
iv)	Leakage current and electric strength at operating temperature	**13**
v)	Transient overvoltages	**14**
vi)	Moisture resistance	**15**
vii)	Leakage current and electric strength	**16**
viii)	Overload protection of transformers and associated circuits	**17**
ix)	Abnormal operation	**19**
x)	Stability and mechanical hazards	**20**
xi)	Mechanical strength	**21**
xii)	Construction	**22**
xiii)	Internal wiring	**23**
xiv)	Components	**24**
xv)	Supply connection and external flexible cords	**25**
xvi)	Terminals for external conductors	**26**
xvii)	Provision for earthing	**27**
xviii)	Screws and connections	**28**
xix)	Clearances, creepage distances and solid insulation	**29**
xx)	Resistance to heat and fire	**30**
xxi)	Resistance to rusting	**31**
xxii)	Radiation, toxicity and similar hazards	**32**

101.1.1 *Criteria of Acceptance*

Sample shall successfully pass all the type tests for proving conformity with the requirements of the standard. If the sample fails in any of the type tests, the testing authority, at its discretion, may call for fresh samples not exceeding twice the original number and subject them again to all tests or to the test(s) in which failure(s) had occurred. No failure should be permitted in the repeat test(s).

101.2 Acceptance Tests

The following shall constitute the acceptance tests:

	Test (1)	*Clause Reference* (2)
a)	Protection against access to live parts	**8**
b)	Power input and current	**10**
c)	Heating	**11**
d)	Leakage current and electric strength at operating temperature	**13**
e)	Moisture resistance	**15**
f)	Leakage current and electric strength	**16**
g)	Provision for earthing	**27**

NOTE — For the purpose of acceptance tests, the humidity treatment shall be done for 24 h while conducting the test for moisture resistance (**15**).

101.2.1 A recommended sampling procedure for acceptance tests is given in Annex J of IS 302-1.

101.3 Routine Tests

The following shall constitute the routine tests:

	Test (1)	*Clause Reference* (2)
a)	Protection against access to live parts	**8**
b)	High voltage	**13.3.2** of IS 302-1
c)	Provision for earthing	**27**

ANNEXES

The Annexes of Part 1 are applicable except as follows.

ANNEX C
(*Foreword*)

AGEING 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:

a) Bean slicers,
b) Blenders,
c) Can openers,
d) Cheese graters,
e) Citrus-fruit squeezers,
f) Graters,
g) Ice-cream machines for use in refrigerators and freezers,
h) Knife sharpeners,
j) Knives,
k) Sieving machines, and
m) Shredders.

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