ETD 32 (26293) P
August 2024

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BUREAU OF INDIAN STANDARDS
DRAFT FOR COMMENTS ONLY

Draft Indian Standard

Specification for domestic electric cooking ovens

(*Second Revision*)

ICS 97.040.20

Electrical Appliances Sectional Committee, ETD 32	Last date of receipt of comment 31 Aug 2024

NATIONAL FOREWORD

The standard adoption clause may be added later on.

This standard was originally published in 1970. The second revision was undertaken to align this standard with IS: 302-1:2008 which is primarily based on the latest IEC Publication. This revision has been undertaken to align the existing standard with the latest IS 302-1:2008 and International Standards.

This standard is to be read in conjunction with IS: 302-1:2008. 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 sub-clauses or portions thereof which are not applicable are indicated as under:

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

Wherever a sub-clause 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 provisions of a sub-clause of IS: 302-1:2008 has been indicated as under:
'Addition - followed by the text of the additional matter'.
Clauses/ tables which are additional to those of IS: 302-1:2008 are numbered starting from 101 and additional sub-clauses are numbered with the main clause number followed by 101, 102, etc, for example, 7.101.

Additional appendices have been numbered starting from AA.
Should however any deviation exist between IS: 302-1:2008 and this standard, the provisions of the latter shall apply.

This standard takes into account the requirements of IS 732: 2019 ‘Code of practice for electrical wiring installations (*fourth revision*), as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, in case of any deviation, wiring rules take precedence.

Determining the performance of ovens is a very important aspect for the selection of an oven. This necessitates performing some actual cooking tests on the ovens. Annex AA gives a few such tests for general guidance.

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 or analysis shall be rounded off in accordance with IS 2:2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

SPECIFICATION FOR DOMESTIC ELECTRIC COOKING OVENS

(Second Revision)

1 SCOPE

This clause of IS: 302-1:2008 is replaced by the following.

This standard deals with the performance, safety and general requirements and methods of test for electrically heated double walled type (insulated or non-insulated) domestic cooking ovens and grill ovens with their rated voltage being not more than 250 V.

NOTE —
(1) This standard does not take into account the special hazards which exist in nurseries and other places where there are young children or aged or infirm persons without supervision; in such cases, additional requirements may be necessary. For appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary.
(2) This standard does not cover cooking ranges and grills (separate units), ovens of single-walled type of construction and microwave cooking ovens.
(3) This standard does not apply to:
a) stationary ovens and stationary grills (IS 302-2-6);
b) warming plates (IS 302-2-12);
c) barbecues for outdoor use;
d) appliances intended for commercial catering; and
e) appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

2 REFERENCES

This clause of Part-1 is applicable except as follows:

Addition

IS No	*Title*
IS 1401:2008	Protection of Persons and Equipment by Enclosures — Probes for Verification
IS/IEC 60320-1	Appliance Couplers for Household and Similar General Purposes - General Requirements

3 TERMINOLOGY

3.1 Normal Operation —

This clause of IS: 302-1:2008 is applicable except as follows:

3.1.9.101 Ovens are operated with the door closed. Ovens having a thermostat are operated so that the mean temperature in the centre of the cavity is maintained at 240°C ± 4°C or at the value obtained with the thermostat adjusted to its highest setting, if this result in a lower temperature.

Other ovens are operated so that the temperature in the centre of the cavity is maintained at 240°C ± 15°C by switching the supply on and off.

3.101 *Oven* — Appliance having a heated cavity with a door and constructed so that food that may be in a container can be placed on a shelf.

3.102 *Oven, Grill* —An oven which is provided with a grilling arrangement with a heating element fixed near the top of the cooking space.

3.103 *Oven, Insulated*— An oven in which the cooking space is bounded by walls and door of insulating material or by metallic walls and door lagged with heat insulating material.

3.104 *Oven, Non-insulated* — An oven in which the cooking space is enclosed by metallic walls and door which are not lagged with any insulating material, though a double-walled construction leaving an air gap in between is employed.

3.105 *Temperature of the Oven* — The temperature anywhere in the central position of the usable cooking space, this space being the cube of 5 cm around the geometric centre of the oven.

3.106 *Cooking Space* — The space within the oven which is above the lowest shelf position and not less than 5 cm from heating surface or 3 cm from non-heating surface of a roof, wall, partition or cover.

3.107 *Touch Control* — Control actuated by contact or proximity of a finger, with little or no movement of the contact surface.

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.

5.3 Addition

If it is evident from the construction of the appliance that the test of one function will produce more favourable results than another, this function is not tested.

5.6 Addition

If two or more cooking functions can be performed simultaneously, they are tested at the same time.

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 Replacement

The oven shall be marked with the following information:

a. Marking indicating the different switch positions and corresponding rating in watts in case multi-step switches are provided; and
b. Type, that is, insulated or uninsulated.
c. Heat Losses

7.6 Addition

'CAUTION — Hot surface' *[Symbol as per IS 302-2-9 to be added]*

7.12 Addition

The instructions for appliances having accessible metal surfaces, other than working surfaces, that have a temperature rise exceeding 90 K during the test of 11 shall include the substance of the following:

The temperature of accessible surfaces may be high when the appliance is operating.

If symbol shown in 7.6 is marked on appliances, the instructions shall state that the surfaces are liable to get hot during use.

The instructions shall

a) state that appliances are not intended to be operated by means of an external timer or separate remote-control system;
b) include details on how to clean surfaces in contact with food;
c) describe in detail the manner of carrying out the various cooking operations which are possible with-the oven and shall, in particular, indicate the best position in the oven for different types of cooking, type of vessels to be used, cleaning instructions and the appropriate thermostat setting

7.14 Addition

The height of the triangle used with symbol shown in 7.6 shall be at least 12 mm.

7.15 Addition

The marking specified for hot surfaces shall be visible when the appliance is operated as in normal use.

7.101 BIS Certification Marking

The appliances may also be marked with the Standard Mark.

7.102 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 except as follows.

8.1.101 Addition - For heating elements situated at the top of an oven or grilling compartment and which glow visibly in normal use, it shall not be possible to touch live parts with test probe 41 of IS 1401, if such elements are controlled by single-pole thermostats or by timers incorporating a single-pole switch.

8.102 Heating elements which are liable to be touched accidentally by a fork or similar pointed object in normal use, shall be so protected that it is not possible to touch their live parts with with test probe 12 of IS 1401 applied without appreciable force. Heating elements situated at the top of an oven or grilling compartment are not considered as liable to be touched by a fork or similar pointed object.

9 STARTING OF MOTOR OPERATED APPLIANCE

This clause of Part 1 is not applicable.

10 INPUT AND CURRENT

This clause of Part 1 is applicable except as follows:

10.1 Addition

If the appliance incorporates more than one heating unit, the total input may be determined by measuring the input of each heating unit separately.

11 HEATING

This clause of Part 1 is applicable except as follows.

11.2 i**s** not applicable.

11.4 Addition

If the temperature rise limits are exceeded in appliances incorporating motors, transformers or electronic circuits, and the power input is lower than the rated power input, the test is repeated with the appliance supplied at 1.06 times rated voltage.

11.5 and 11.6 are not applicable.

11.7 Addition

Oven is operated until steady conditions are established but for not longer than 60 min. However, if oven has a timer, the timer is reset as many times as necessary to establish steady conditions.

11.8 Addition

The temperature of the external enclosure of the cooking oven shall not exceed 85°C. An exception up to 150°C shall be permitted for those places where it is obviously difficult to keep temperature low, such as glass window, oven door, back housing, small area of oven hinges oven vents and return flanges on oven doors.

12 VOID

13 LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE AT OPERATING TEMPERATURE

This clause of Part 1 is applicable except as follows.

13.1 Addition

If a grill is incorporated in an oven, either the oven or the grill is operated, whichever is more unfavourable.

14 TRANSIENT OVERVOLTAGES

This clause of Part 1 is applicable.

15 MOISTURE RESISTANCE

This clause of Part 1 is applicable except as follows.

15.3 Addition

A quantity of 0.5 litre of water containing approximately 1 percent sodium chloride (NaCl) is poured uniformly over the interior bottom surface of the oven.

For ovens with heating elements that are covered by vessels in normal use, the spillage test is carried out by steadily pouring saline solution onto the heating surface over a period of 1 min, 0.1 l of solution being used for every 100 cm^2 of the heating surface.

For ovens provided with a tray or other receptacle for collecting spilled liquid, the capacity of the receptacle is measured and the spillage test is carried out by pouring a quantity of cold water equal to the capacity of the receptacle plus 10 ml per 100 cm^2 of the surface of the liquid in the receptacle when it is full through the openings in the upper surface of the oven which gives access to the receptacle.

If controls are mounted in the horizontal cooking surface of the oven, the oven shall be subjected to the spill test to simulate the conditions that might occur during actual use. There shall be no evidence of arcing, or short-circuiting, no evidence of insulation breakdown and after the test the oven shall comply with the requirements of **13**.

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

The oven is operated at the maximum setting of the thermostat, if provided. The oven is operated such that the input is 1.15 times the maximum rated input. The oven is operated under these conditions for a period of 96 operating hours. After the test, the oven shall withstand the electric strength test of 16.3 of IS 302-1:2018.

19 ABNORMAL OPERATION

This clause of Part 1 is applicable except as follows.

19.1 Addition

The tests of 19.4 and 19.5 are only applicable if oven incorporate a timer or if their instructions indicate a cooking operation longer than 1 h.

19.2 Addition

The oven is placed as near to the walls of the test corner as possible. The oven is tested empty. Lids and doors are open or closed, whichever is more unfavourable. Detachable parts are in position or removed, whichever is more unfavourable.

19.3 Addition

Air-circulating fans of food dehydrators are disconnected.

19.8 Not applicable
19.10 Not applicable

20 STABILITY AND MECHANICAL HAZARDS

This clause of Part 1 is applicable except as follows.

20.101- Ovens having doors with a horizontal hinge at their lower edge and on which a load is likely to be placed shall have adequate stability.

Compliance is checked by the following test:

The oven is placed on a horizontal surface with the door open and a mass of 3.5 kg is gently placed on the geometric centre of the door.

NOTE — A sandbag may be used for the load.

Doors, having a vertical hinge are opened through an angle of 90°, and a downward force of 50 N is then applied gently to the top of the door at the extremity furthest from the hinge.

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

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

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

Damage to, and deformation of, doors and hinges are neglected.

During these tests, the oven shall not tilt.

This test is not carried out on ovens with doors having a dimension less than 225 mm from the hinge to the opposite edge or on ovens with doors which cannot support dishes in the fully open position.

21 MECHANICAL STRENGTH

This clause of Part 1 is applicable except as follows

21.1 If the oven incorporates visibly glowing heating elements enclosed in glass tubes, the blows are applied to the tubes as mounted in the appliance if they are:
a) located at the top of the oven and accessible to test probe 41 of IS 1401; and
b) located elsewhere in the oven and accessible to test probe B of IS 1401.

22 CONSTRUCTION

This clause of Part 1 is applicable except as follows.

22.24 Addition

Heating elements shall be constructed or supported so they are unlikely to become displaced in normal use.

Compliance is checked by inspection.

22.101 Heating Elements - The heating element or elements shall be so designed and located that the heating conditions required for cooking can be obtained and local overheating or burning of the foodstuffs is avoided. Where the elements are located within the heating chamber they shall be so designed or protected that inadvertent contact with them while loading or unloading the oven is not possible. The elements shall be easily accessible for inspection, repair or replacement. If the appliance incorporates open coil heating elements which glow visibly in normal use, such elements shall only be situated at the top of ovens or grilling compartments. Wherever open type heating elements are used, these should be adequately supported throughout their length.

Compliance is checked by inspection.

22.102 Timers intended to delay the operation of a heating element shall not control a radiant grill, unless such a grill is thermally controlled and incorporated in an oven or other compartment.

Compliance is checked by inspection.

22.103 Oven vents shall be constructed so that they do not discharge moisture or grease in such a way that clearances and creepage distances are affected.

Compliance is checked by inspection.

22.104 Oven shall be constructed so that shelves can easily slide in the supports and do not fall out of position when the sides are displaced as much as possible.

Compliance is checked by inspection and by manual test.

22.105 Oven shall not have openings on the underside that would allow small items to penetrate and touch live parts.

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

22.106 The heating chamber shall be so constructed and reinforced that baking sheet or dish are adequately supported, and the material of heating chamber does not warp or buckle when heated to the maximum temperature of the oven. Open joints through which the moisture from the cooking material can pass shall not be allowed in the construction.

22.107 Vents - One or more suitable vents shall be provided near the top of the oven so arranged that they deflect the fumes and moisture away from any adjoining walls, heat insulating material, wiring, control knobs or mother accessories of the oven.

22.108 Baking Sheet and Rock - Every oven shall be supplied with at least one baking sheet and one baking rack. In addition, one grilling rack shall be provided in case of grill oven; in the case of bowl type ovens, a suitable rack should be provided to support the sheet or rack clear off the oven bottom. In a box-type oven, at least two runners or supports shall be provided on each side of the oven liner to accept the baking sheet or rack by being slid into position. The runners or supports shall be so arranged that the sheet or rack does not tilt during withdrawal. The baking sheet and rack shall be made of tinned iron, aluminum or any other suitable material, properly reinforced, if necessary, so that they do not warp on heating.

22.109 Baffle and Reflector Plates – A baffle plate or a reflector plate depending on the position of heating element either at the bottom or at the top respectively shall be provided to ensure uniform temperature distribution and to protect the element from spillage. The plates shall be of adequate thickness and strength so that they do not warp or buckle when heated and shall be removable.

22.110 Switches and controls shall be located or protected so that they are not subjected to mechanical injury, spillage from cooking or collection of grease.

22.111 In case the temperature of the oven exceeded 250°, the oven shall be provided with thermostat having not less than three heat steps. A pilot lamp shall be provided to give an indication when the contacts of thermostats are closed. The oven thermostat shall have a voltage and current rating not less than the heating element(s) it controls.

A non-automatic oven shall be provided with a temperature indicator. In case of grill type ovens, the provisions for separate switching arrangement of the grilling element shall be provided.

23 INTERNAL WIRING

This clause of Part 1 is applicable.

23.101 Addition

The wiring and all the components used in an oven shall be constructed and fixed in such a manner that they shall be able to withstand continuously the temperatures to which they are exposed when the oven is operated at its maximum temperature. All the wiring and components shall be suitably protected from spillage or overflow from cooking vessels in the oven.

24 COMPONENTS

This clause of Part 1 is applicable except as follows:

24.1.5 Addition

For oven couplers incorporating thermostats, thermal cut-outs or fuses in the connectors, IS/IEC 60320-1 is applicable except that:

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

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

24.101 Thermostats and energy regulators incorporating an off position shall not switch on as a result of variations in ambient temperature.

Compliance is checked by the following test that is carried out on three devices.

The device, set at the off position, is placed for 2 h in an ambient temperature of -20 (+0 -5) °C and then at:
a) t°C, where t is the temperature according to the T-marking; and
b) 55°C, for devices without a T-marking.

During the test, the off position shall be maintained. A test voltage of 500 V is applied across the contacts for 1 min. No breakdown shall occur.

24.102 Thermal cut-outs incorporated in food dehydrators for compliance with 19.4 shall not be self-resetting.

Compliance is checked by inspection.

25 SUPPLY CONNECTIONS AND EXTERNAL FLEXIBLE CABLES AND CORDS

This clause of Part 1 is applicable except as follows.

25.1 Addition

Ovens incorporating an oven inlet that does not comply with the standard sheets of IS/IEC 60320-1 shall be supplied with a cord set.

26 TERMINALS FOR EXTERNAL CONDUCTORS

This clause of Part 1 is applicable.

27 PROVISIONS FOR EARTHING

This clause of Part 1 is applicable except as follows.

27.1 Addition

Earthing continuity shall not depend upon flexible metallic tubes, coiled springs or cord anchorages.

28 SCREWS AND CONNECTIONS

This clause of Part 1 is applicable.

29 CREEPAGE, CLEARANCES 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.

29.3 Addition

This requirement does not apply to the sheath of a visibly glowing heating element that is inaccessible to test probe 41 of IS 1401.

29.101 Addition

If bare conductors and connecting devices for heating elements inside ovens or grills are subject to deposition of fat or liquids in normal use, the creepage distances and clearances concerned shall be not less than 1’5 times the relevant values shown in the table.

30 RESISTANCE TO HEAT, FIRE AND TRACKING

This clause of Part 1 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 HEATING-UP TIME

The oven is connected to supply and switched on with the maximum rated power supplied to the elements and the oven temperature is observed. The time taken by the oven to reach a temperature 180°C above the ambient at center of cavity as defined in 2.110 and 2.111 is taken as the heating-up time. Any element which according to the instructions supplied with the oven is to be tested only for grilling, toasting or broiling shall be disconnected during this test, and the oven shall be empty except for the shelves or racks supplied with it.

The heating-up time shall not exceed 5 minutes.

102 HEAT LOSSES

The oven is thermostatically controlled at 180°C above the ambient using an auxiliary thermostat, if necessary. After a stabilizing period of at least 2 hours at this temperature, the test is commenced by recording the time and the reading of a watthour meter just after a cut-out of the thermostat. The test is discontinued after the first cut-out of the thermostat after 4 hours, recording the time and the reading of the watthour meter. The average power in watts (calculated by dividing the watthour reading by total number of hours) required to maintain the steady temperature specified is determined, and the average heat loss is computed by dividing the watt input obtained by the inside surface area of the heating chamber expressed in square centimeters. For the purpose of this test the dimensions shall be measured to the nearest 0’5 cm and, the total area obtained shall be rounded off to the nearest square centimeter.

The heat losses shall not exceed 6 W per 100 cm^2 of the inside surface of the heating chamber for insulated ovens, and 10 W per 100 cm^2 for non-insulated ovens.

103 UNIFORMITY OF TEMPERATURE

Wheat flour of the quality used for biscuits and cakes shall be obtained. A quantity has to be weighed out and placed in a fine muslin pouch. It will be carefully sprinkled over the baking sheet provided with the oven so that it is covered uniformly over the whole surface, and the weight of

the flour so spread is between 9 and 11 g for every 100 cm2 of the area covered. Any element in the oven which is designed for use only in toasting and grilling is disconnected. The oven is operated at 175 & 5”C, and when steady conditions are reached and the thermostat has cycled at least five times, the sheet is placed on one of the supports provided on the oven liner. The sheet is withdrawn after 10 minutes and the contents are examined visually. Uniform browning of the flour is taken to indicate uniform temperature in the horizontal plane tested. If the baking sheet provided with the oven is of aluminum, it is blackened on both the sides by painting it with lard and burning off in an oven at 275°C and the above test is carried out again with the blackened sheet or with a sheet of black iron. The above tests are repeated at the level of each pair of runners of group of supports provided in the oven.

The temperature within the oven in the same horizontal plane shall be uniform.

104 THERMOSTAT SETTING AND DIFFERENTIAL (FOR AUTOMATIC OVENS ONLY)

The oven temperature is measured, with baking sheets and dishes, if any, removed within 10 seconds of every cut-in and cut-out of the thermostat, after stable conditions have been obtained, with a thermostat setting of 100°C. The oven temperature is taken as the average of not less than 3 consecutive sets of observed minimum and maximum temperatures corresponding to the make and break of the thermostat. The tests are repeated with the thermostat setting at 100°C 150°C, 200°C and 250°C.

The maximum differences in temperature observed during any one of the above tests shall be taken as the temperature differential of the oven. The temperature of the oven shall not differ from the thermostat setting by more than 15°C where a thermostat is provided and the temperature differential of an automatic oven shall not exceed 10°C.

105 TESTS

105.1 Type Tests - The tests specified in Table 101 shall constitute the type tests and shall be carried out on one sample selected preferably at random from regular production lot (*see* **5.3**). Before commencement of the tests, the oven 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 101.1 Schedule of Type Tests

Sl no.	Tests	Clause Reference
(1)	(2)	(3)
i)	Protection against access to live parts	8
ii)	Input and current	10
iii)	Heating	11
iv)	Leakage current and electric strength at operating temperature 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)	Endurance	18
x)	Abnormal operation	19
xi)	Stability and mechanical hazards	20
xii)	Mechanical strength	21
xiii)	Construction	22
xiv)	Internal wiring	23
xv)	Components	24
xvi)	Supply connections and external flexible cables and cords	25
xvii)	Terminals for external conductors	26
xviii)	Provisions for earthing	27
xix)	Screws and connections	28
xx)	Creepage, clearances distances and solid insulation	29
xxi)	Resistance to heat, fire and tracking	30
xxii)	Resistance to rusting	31
xxiii)	Radiation, toxicity and similar hazards	32
xxiv)	Heating-up time	101

xxv)	Heat losses	102
xxvi)	Uniformity of temperature	103
xxvii)	Thermostat setting and differential	104

105.1.1 *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).

105.2 Acceptance Tests

The following shall constitute the acceptance tests:

	Test (1)	Clause Reference (2)
a)	Protection against access to live parts	8
b)	Input and current	10
c)	Heating	11
d)	Leakage current and electric strength at operating temperature at operating temperature	13
e)	Moisture resistance	15
f)	Leakage current and electric strength	16
g)	Provision for earthing	25
h)	Uniformity of temperature	103

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

105.3 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 of IS 302-1
c)	Provision for earthing	27

ANNEXES

The Annexes of Part 1 are applicable except as follows.

Annex AA

COOKING TESTS

AA-1. GENERAL

AA-l.1 The cooking tests described in the following clauses shall be performed by a trained cook experienced in evaluating the performance of ovens and the results judged on the points indicates by a panel of at least five persons. In case the results obtained are deemed unsatisfactory, it will be open to the manufacturer or supplier to depute his own trained cook to perform the tests under supervision of the testing authority.

AA-2. GENERAL CONDITIONS FOR THE COKKING TESTS

AA-2.1 The oven shall be preheated at its maximum operating temperature for at least 2 hours before commencing the cooking tests. The temperatures recommended in the standard recipes shall be obtained, if necessary, by applying a suitable correction to the thermostat settings obtained from preliminary experiments with the empty oven. In the case of non-automatic ovens an auxiliary thermostat may be used to control the temperature. The recommended temperatures shall be maintained within ±5°C during the period of the tests. As far as possible well known brands of ISI-certified ingredients shall be used for the tests. The manufacturers' instructions regarding the switching of elements or placement of dishes shall be followed as long as they do not conflict with the directions given herein below.

AA-3. TEST BISCUITS A

AA-3.1 Recipe: 250 g *vanaspati* (hydrogenated oil)
200 g sugar
2 eggs (each weighing 50 to 56 g)
500 g wheat flour (*maida*)
Vanilla and salt to taste

Preparation: The baking sheet is covered at least to 90 percent of its surface with biscuits formed by a cutter with section given in Fig. 103.

The baking sheet is placed on a rack or support near the centre of the height of the heating chamber of the oven and baked at 225°C till golden yellow. The baking time is noted. The baked biscuits are cooled on a rack and both sides of all the biscuits are examined for uniform development of colour.

FIG. 103 BISCUIT CUTTER

AA-4. TEST CAKE B

AA-4.1 Recipe: 200 g *vanaspati* (hydrogenated oil)
200 g sugar
3 eggs (each weighing 50 to 56 g)
500 g wheat flour (*maida*)
125 ml milk
12 g baking powder
Salt to taste

Preparation:

The cake is baked at 175°C in a mould of black sheet steel placed on the lowest runners or supports on the oven liner. The baking time is noted, and the cake is cooled on a rack. After cooling it is sliced and the interior is examined for uniform and good texture. The crust is examined for uniform colour.

AA-5. TEST CAKE C

AA-5.1 Recipe: 3 egg yolks
3-4 tablespoons hot water
100 g powdered sugar
Whipped white of 3 eggs
50 g sugar
100 g wheat flour (*maida*)
100 g starch flour
2 tea spoons baking powder
Vanilla

Preparation:

The cake is baked at 200°C in a mould of black steel sheet lined with grease-proof paper, laced on the lowest level rack provided. The baking time is noted. The cake is cooled on a rack and its crust and texture are examined.

AA-6. TEST CAKE D - Eggless Sponge Cake (Indian Style)

AA-6.1 - Recipe: 1 cup (100 g) plain flour
200g condense milk
2-tbsp. butter at room temperature
1-tsp vanilla essence (5ml)
1- tsp baking soda (5ml)
1- tsp Baking powder (5ml)
1/2 cup (70ml) aerated soda (water)

Preparation

- Preheat the oven at 160°C for 10 min.
- Mix the dry ingredients together and sieve.
- Whisk the liquid ingredients separately except the aerated soda water.
- Add the dry ingredient to the liquid ingredients, add the aerated soda water slowly, and whisk.

- (do not over beat the batter only enough to mix everything)
- Immediately pour the batter into a 7” grease and dusted Tin mould/baking paper on the bottom of the tin mould/Silicone mould.
- Place the Tin mould /baking paper on the bottom of the tin mould/Silicone mould. in the oven at 160°C for 25-min to 30-min

Open the oven and check the cake by poking a skewer if the skewer is wet bake for another 5 minutes. The baking time is noted. The cake is cooled on a rack and its crust and texture are examined.

AA-7. GRILLING TEST (FOR GRILL-OVEN ONLY)

AA-7.1 The grilling pan rack is covered with slice of white bread, 10 to 15 mm thick and kept as directed by the manufacturer’s instruction, with the grilling element(s) switched on. The toasting is carried out till the slices present a light brown appearance. The rack is removed and the slices are examined for evenness of browning. In this test, only the area of the rack recommended by the manufacturer as the grilling area is covered by the slices, and all the slices should be evenly browned.