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अनुभाग 30 रूम हीटर

(पहला पुनरीक्षण)

Indian Standard

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

PART 2 PARTICULAR REQUIREMENTS

Section 30 Room Heaters

(First Revision)

1CS 13.120; 97.100.10

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Electrical Appliances Sectional Committee, ET 32

FOREWORD

This Indian Standard (First Revision) (Part 2/Sec 30) 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 1992. This revision has been undertaken primarily to align the existing standard with latest International Standard and also to cover requirements of other types of radiators (room heaters), namely, convector heaters, fan heaters, heaters for use in greenhouses, liquid filled heaters, panel heaters, and tubular heaters which were earlier not covered.

This standard covers the safety requirements of electric radiator (room heaters). This standard however does not cover the performance requirements, which are covered under a separate standard (*see* IS 369).

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 Indian 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, where 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 a 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 'Safety of household and similar electrical appliances: Part 1 General requirements *(sixth revision)*'. For the sake of convenience, the clauses of this standard correspond to those of IS 302-1, instead of reproducing full text of each clause, clauses of IS 302-1 which are applicable (which means that relevant provisions of the clause apply) or not applicable and the sub-clauses 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 is applicable/not applicable'; and
b) In case of sub-clause or part thereof 'Not applicable'.

Wherever a sub-clause of IS 302-1 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 sub-clause of IS 302-1 has been indicated as under:

'Addition — followed by the text of the additional matter'.

(Continued on third cover)

Indian Standard

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

PART 2 PARTICULAR REQUIREMENTS

Section 30 Room Heaters

(First Revision)

1 SCOPE

This clause of Part 1 is replaced by the following:

This standard deals with the safety of electric radiators (room heaters) for household and similar purposes, their rated voltage being not more than 250 V for single-phase appliances and 415 V for other appliances.

NOTES

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

a) Convector heaters;
b) Fan heaters;
c) Heaters for use in greenhouses;
d) Liquid filled radiators;
e) Panel heaters;
f) Radiant heaters; and
g) Tubular heaters.

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 the 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 prevented by applications which are encountered by all persons in and around the home. However, in general, it does not take into account:

a) Use of appliances by young children on inform persons without supervisions; and
b) Playing with the appliance by young children.

102 Attention is drawn to the fact that:

a) For appliances intended to be used in vehicles or on board ships or aircraft, additional requirement may be necessary;
b) Additional requirement may be specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities; and
c) For appliances intended to be used in the presence of combustible dust, for example, in barns or stables, additional requirement may be necessary.

103 This standard does not apply to:

a) Appliances intended exclusively for industrial purpose;
b) Appliances intended to be used where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
c) Corrosive or explosive or explosive atmosphere (dust, vapour or gas);
d) Heaters that are built into air conditioners;
e) Clothes dryers and towels rails;
f) Thermal storage room heaters;
g) Heating appliances for breeding and rearing animals;
h) Foot warmers and heating mats;
j) Flexible sheet heating mats;
k) Flexible sheet heating elements for room heating;
m) Heated carpets;
n) Central heating system; and
p) Heating cables.

2 REFERENCES

This clause of Part 1 is applicable except as follows:

IS No.	*Title*
1060 (Part 1) : 1966	Methods of sampling and test for paper and allied products: Part 1 *(revised)*
1401 : 2007	Accessibility test probe (*second revision*)
11000 (Part 2)/ Sec 2) : 1984	Fire hazard testing: Part 2 Test methods, Section 2 Needle flame test
12766 : 1997	Paper, computer — Specification *(first revision)*

3 TERMINOLOGY

This clause of Part 1 is applicable except as follows:

3.101 Visibly Glowing Radiant Heater — Heater incorporating at least one visibly glowing heating element.

3.102 Fan Heater — Heater in which the movement of the air over the heating element is assisted by a fan.

3.103 Heater for Mounting at High Level — Heater intended to be fixed at a height of at least 1.8 m above the floor.

3.104 Fireguard — That part of the enclosure of a visibly glowing radiant heater through which the heating element is normally visible and which is intended to guard against direct access to the heating element.

3.105 Immediate Surround — Any surface within

25 mm of the boundary of an air-outlet grills or fireguard.

NOTE — Details of the way in which this distance is determined are shown in Fig. 101 for air-outlet grills and Fig. 102 for fireguards.

4 GENERAL REQUIREMENT

This clause of Part 1 is applicable.

5 GENERAL CONDITIONS FOR THE TESTS

This clause of Part 1 is applicable except as follows:

5.2 Addition

NOTE

101 If heaters are intended to be installed adjacent to each other, a sufficient number are required in order to determine the effects of adjacent heaters on the appliance under test.

5.3 Addition

The appliance that is used for the test of **19** is also used for the test of **22.24.** The test of **22.24** is carried out after the tests of **29**, if it is carried out on the same appliance.

5.6 Addition

Thermostats sensitive to the room air temperature, such as those having a sensing element located in the inlet, are short-circuited. However, if the thermostat can be set so that it does not cycle, it is not short-circuited.

NOTE

101 For electronic controls it may be necessary to render the sensing element incorporative instead of short-circuiting the thermostat.

5.10 Addition

Heaters intended to be installed adjacent to each other are installed in accordance with the instructions.

Additional Sub-clauses

5.101 Heaters intended to be used as both portable appliances and fixed appliances are subjected to the tests applicable to both types of appliances relevant for each type, unless the tests for one type cover the other.

5.102 If the heater is a combination of two or more types, is subjected to the tests relevant for each type, unless the tests for one type cover the other.

Heaters for wall-mounting are tested both as heater for mounting at high level and as heaters for mounting other than at high level. Unless the installation instructions state that the heater has to be installed 1.8 m above the floor.

6 CLASSIFICATION

This clause of Part 1 is applicable except as follows:

6.2 Addition

Heaters intended for use in greenhouses or building sites shall be at least IPX4.

7 MARKING AND INSTRUCTIONS

This clause of Part 1 is applicable except as follows:

7.1 Addition

Heaters intended to be filled with liquid by the user shall be marked with the maximum and minimum liquid levels.

Heaters shall be marked 'Do not cover'. This marking is not required for:

a) Heaters for mounting at high level,
b) Visibly glowing radiant heaters,
c) Heaters constructed so that they cannot be covered, and
d) Heaters also intended to dry clothes.

Heaters having a fireguard that is intended to be removed for transportation or storage shall be marked to state that the heater must not be operated without this guard in place.

7.6 Addition

Do not cover.

7.12 Addition

If the symbol as specified in **7.6** is marked on the appliance, its meaning shall be explained.

The instructions for heaters marked 'Do not cover' shall contain the substance of the following:

Warning — In order to avoid overheating, do not cover the heater.

The instructions shall state that the heater must not be located immediately below a socket outlet.

The instructions for heaters with heating elements that are in direct contact with accessible glass panels shall state that the heater must not be used, if the glass is damaged.

The instructions for visibly glowing radiant heaters, other than heaters for mounting at high level, shall include the substance of the following:

Do not use this heater with a programmer, timer or any other device that switches the heater on automatically, since a fire risk exists, if the heater is covered or positioned incorrectly.

The instructions for visibly glowing radiant heaters having a fireguard that can be partly removed without the aid of a tool shall include the substance of the following:

a) Fireguard of this heater is intended to prevent direct access to heating elements and must be in place when the heater is in use, and
b) Fireguard does not give full protection for young children and for infirm persons.

The instructions for portable heaters shall include the substance of the following:

Do not use this heater in the immediate surroundings of a bath, a shower or a swimming pool.

Instructions shall be provided for cleaning the reflector of visibly glowing radiant heaters, if appropriate.

Instructions shall be provided for replacing the lamps of fuel-effect heaters.

The instructions for oil-filled radiators include the substance of the following:

a) This heater is filled with a precise quantity of special oil. Repairs requiring opening of the oil container are only to be made by the manufacturer or his service agent who should be contacted if there is an oil leak; and
b) When scrapping the heater, follow the regulations concerning the disposal of oil.

7.12.1 *Addition*

The installation instructions for heaters intended to be fixed by screws or other means shall give details on the method of fixing.

The instructions for stationary visibly glowing radiant heaters shall warn about the possible danger of installation close to curtains and other combustible materials.

The instructions for heaters mounting at high level shall state that the heater must be installed at least 1.8 m above the floor.

The instructions for fixed heaters likely to be used in a bathroom shall state that the heater is to be installed so that switches and other controls cannot be touched by a person in the bath or shower.

If rollers or feet are supplied with the heaters, the installation instructions shall state how they have to be fixed to the heater.

The instructions for heaters intended to be installed in wardrobes shall give detailed proper installation in a wardrobe.

7.14 Addition

The height of symbol as specified in **7.6** shall be at least 15 mm.

The height of the words 'Do not cover' shall be at least 3 mm.

Compliance is checked by measurement.

7.15 Addition

For heaters for mounting at high level, the indication of the different positions of switches shall be visible from a distance of 1 m.

The marking concerning covering shall be visible after the heater has been installed. It shall not be placed on the back of the portable heaters.

The marking concerning removable fireguards shall be visible before fitting the fireguard.

Additional Sub-clause

7.101.0 *BIS Certification Marking*

The radiators (room heaters) may also be marked with the Standard Mark.

7.101.1 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 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:

8.1.1 *Addition*

Detachable fireguards are not removed if their removal requires the use of a tool, provided that:

a) Instructions state the plug must be removed from the socket-outlet before cleaning the reflector; or
b) Heater incorporates a switch having a contact separation in all poles that provides full disconnection under overvoltage category III conditions.

8.1.3 Not 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:

11.2 Replacement

Heaters normally placed on the floor are placed in a test corner as follows:

a) Portable fan heaters are placed with the back 150 mm from one of the walls and away from the order wall;

b) Other heaters are placed on the floor with their back as near to one of the walls as possible and away from the other wall. However, circular and similar heaters that emit heat in several directions are placed 300 mm from one of the walls and away from the other wall. Heaters containing PTC heating elements are placed away from the walls, if this results in higher temperatures.

NOTES

101 If the back of heater is not obvious, the heater is oriented in the most unfavourable position.

102 For circular and similar heaters, the distance is measured between the wall and the enclosure of the heater.

Fixed heaters are installed in the test corner as follow, unless otherwise specified in the installation instructions:

a) Heaters for mounting at high level are fixed to one of the walls and as near as possible to the other wall and ceiling;

b) Other heaters for wall mounting are fixed to one of the walls and as near as possible to the other wall and floor. A shelf having a depth of 200 mm and of sufficient length to cover the heater is fixed over the heater. It is positioned as close as possible to the heater; and

c) Heaters for ceiling mounting are fixed to the ceiling as near as possible to the heater.

Built-in heaters are installed as close as possible to a floor or ceiling, unless otherwise specified in the installation instructions.

Dull black-painted plywood approximately 20 mm thick is used for the test corner, the shelf and for installation of built-in heaters.

The ceiling of the test corner is covered with insulating material having a coefficient of thermal insulation of approximately 3.2 m^2 K/W.

If a fixed heater has an opening at floor level, a felt pad 20 mm thick is placed on the floor and pushed flat into the opening as far as the construction will permit. If a guard is provided or if the opening is too small to permit the entry of the pad, the pad is pushed as close as possible against the opening.

NOTE

103 The purpose of the felt pad is to simulate a carpet that might restrict the airflow.

Heaters having an air-outlet grille intended to be recessed in a floor, a windowsill or similar location are also tested with the air outlets covered with the felt strips specified in **19.103**. The strips are applied at right angles to the longest side of the outlet grilles. The strips are applied to each half of the grille in turn to the complete grille.

11.3 Addition

The temperature rise of the felt pad is determined by means of thermocouples attached to small blackened disks of copper or brass, 15 mm in diameter and 1 mm thick. The disks are placed on the surface of the pad.

11.4 Addition

If the temperature rise limits 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 the rated voltage.

11.6 Replacement

Combined appliances are operated as heating appliances.

11.7 Replacement

Appliances are operated until steady conditions are established.

11.8 Addition

In Table 3, stationery heaters are considered liable to be operated continuously for long periods.

The temperature rise limits of motors, transformers and components of electric circuits including parts directly influenced by them, may be exceeded when the appliance is operated at 1.15 times the rated power input.

For liquid-filled radiators, the temperature rise of parts in contact with oil is not measured. However, for unvented liquid-filled radiators, the temperature rise of the outer surface of the liquid container is measured. It shall be at least 50 K less than the boiling point of the liquid.

NOTE

101 The measurement is made even if the container is inside the enclosure of the appliance.

The temperature rise of surfaces of heaters shall not exceed the values shown in Table 101.

For heaters intended to be fixed under benches, the temperature rise of surfaces accessible to the test rod shall not exceed the limits specified in Table 3 for parts are held for short periods only.

12 VOID

13 LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE

This clause of Part 1 is applicable.

Table 101 Temperature Rise for Surface

(*Clause* 11.8)

Sl No.	Surface	Temperature Rise K
(1)	(2)	(3)
i)	Heaters for mounting at high level and fireguards and their immediate surrounds	No limit
ii)	Air-outlet grilles[1] and their immediate surrounds that area of metal and accessible to the test rod[2]:	
	a) Fan heaters	175
	b) Others	130
iii)	Other surfaces that are accessible to the test rod[2]:	
	a) If of material	85
	b) If of glass, ceramic or similar material	100
	Air-outer grilles of built-in heaters having air outlets in the floor, window-sill or similar locations:	
	a) If of metal	45
	b) If of other material	50
	Surface of felt pad	60

[1] If the air-outlet grille cannot be identified and the air is emitted through a substantial part of the enclosure, the temperature rise limit of 85 K applies.

[2] The test rod is 75 mm in diameter, of unrestricted length and with a hemispherical end.

14 TRANSIENT OVERVOLTAGES

This clause of Part 1 is applicable.

15 MOISTURE RESISTANCE

This clause of Part 1 is applicable.

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 Modification

Instead of the test specified, appliances are subjected to the tests of **19.6, 19.11, 19.12** and **19.101** to **19.114** as applicable.

19.13 Addition

During the test of **19.106,** the temperature of the motor windings shall not be exceeding the values specified in Table 8.

19.101 Appliances are operated as specified in **11** but the power input is 1.24 times the rated power input.

All thermal controls that operate during the test of 11 are short circuited simultaneously.

NOTE — The pressure in liquid-filled radiators is measured for test of 22.7.

19.102 Circular and similar portable heaters that emit heat in several directions are placed as close as possible to one of the walls of the test corner and operated at 1.24 times the rated power input.

NOTE — Thermal controls that operate during the test of **11** are allowed to operate.

19.103 Heaters are operated as specified in **11** but with the appliance covered. This does not apply to:

a) Heaters for mountings at high level, except those intended to be installed in wardrobes;
b) Visibly glowing radiant heaters; and
c) Portable fan heaters.

The covering is made with felt strips each having a width of 100 mm and which are lined with a single layer of textile material. The felt has a specific mass of 4 ± 0.4 kg/m^2 and a thickness of 25 mm. The textile material consists of pre-washed double-hemmed cotton sheet having a specific mass between 140 g/m^2 and 175 g/m^2 in the dry condition.

Thermocouple is attached to the back of small blackened disks of copper or brass, of 15 mm diameter and 1 mm thick. The disks are spaced 50 mm apart and placed between the textile material and felt on the vertical centreline of each strip. The disks are supported to prevent them from sinking into the felt.

The strips are applied with the textile material in contact with the heater so that they cover the top and front surface down to the floor

The rear surface of the heater is completely covered with strips down to the floor, if:

a) Heater is constructed to stand away from the wall;
b) Fixed heaters, the gap between the heater and the wall exceeds 30 mm, and the horizontal distance:
   1) between any two fixing points or spaces exceeds 200 mm; or
   2) between any fixing or spaces and the end of heater exceeds 100 mm, otherwise the rear surface is covered to a distance of approximately one-fifth of the height of the heater from the top.

The top rear surface of other heaters is covered to a distance of approximately one-fifth of the height of the heater.

The strips are applied to each half of the heater in turn and then to the complete heater.

The temperature rise of the strips shall not exceed 150 K but an overshoot of 25 K is allowed during the first hour.

NOTES

1 Thermal controls that operate during the test of **11** are allowed to operate.

2 The pressure in liquid-filled radiators is measured for the test of **22.7**.

19.104 Buit in heaters having air outlets in the floor, windows-sill or similar locations are operated as specified in **11** with the grilles covered. Thermal Controls that operate during the test of **11** are short-circuited.

The temperature rise of the strips shall not exceed 150 K but an overshoot of 25 K is allowed during the first hour.

19.105 Heaters having a liquid container that is intended to be filled by the user operated as specified in **11** but with the container empty.

NOTE — Thermal controls that operate during the test of **11** are allowed to operate.

19.106 Fan heaters and other heaters incorporating motors are operated as specified in **11.** However, the heater is supplied at rated voltage with the motor rotor locked.

NOTE — Thermal controls that operate during the test of **11** are allowed to operate.

19.107 Fan heaters having an enclosure substantially of non-metallic material are operated at their working voltage as specified in **11** except that the motor is supplied separately at its working voltage. Thermal controls that operate during the test of **11** are short-circuited.

When steady conditions are established, the voltage applied to the motors is reduced until the running speed of the motor is just sufficient to prevent the thermal cut-out from operating the voltage applied to the heating elements being maintained at the value used for **11.4.**

Under this condition the heater is again operated until steady condition is established or for 1 h, whichever is longer.

After this period, the airflow is further restricted to verify that a thermal cut-out operates.

NOTE — The reduced voltage applied to the motor may be determined as follows:

The voltage is reduced by 5 percent and the motor is operated under this condition for 5 min. This procedure is repeated until a thermal cut-out operates. The voltage then increased by 5 percent, this being the reduced voltage to be used for the test.

19.108 Portable fan heaters are operated as specified in **11**.

A rectangular sheet of paper is held against air inlets, without additional pressure. The paper has an area sufficient to cover the surface where air inlets are situated and is moved in any direction in order to restrict the airflow so that the most unfavourable conditions are established.

The paper has a specific mass of 72 ± 2 g/m^2 and burst strength 2 711 g/cm^{2}as per **12.5.4** of IS 1061 (Part 1) and Tablel of IS 12766.

The test is carried out for 4 h.

If the enclosure has more than one surface where air situated, these surfaces are covered in turn.

NOTES

1 Surface on the same side of the heater is assumed to be one surface.

2 The most unfavourable conditions are usually obtained by positioning the paper so that the thermal cut-out is prevented from operating.

3 When moving the paper downwards care is to be taken to ensure that the supporting surface does not limit its moment.

4 Thermal controls that operate during the test of **11** are allowed to operate.

19.109 Portable fan heaters are operated as specified in **11** but placed so that the airflow is directed against one of the walls of the test corner. The heater is then moved as near as possible to the wall without the thermal cut-out operating. Thermal controls that operate during the test of **11** are short-circuited.

The temperature rise of the wall shall exceed 150 K.

19.110 Portable visibly glowing radiant heaters are operated as specified in **11** but placed so that the radiation is directed against one of the walls of the test corner. The heater is placed with fireguard 500 mm from the wall and this distance is progressively increased so that the highest wall temperature is measured.

The temperature rise of the wall shall not exceed 70 K.

19.111 Visibly glowing radiant heaters for mounting at high level are operated as specified in **11** but at rated power input.

When steady conditions are established, a piece of dry bleached cotton flannelette, 100 mm wide and having a specific mass between 130 g/m^2 and 165 g/m^2, is held taut against the central part of the fireguard. The flannelette is held from the top to the bottom or, for fireguard in the horizontal plan, from the back to the front.

The flannelette shall not smolder or ignite within 10 s.

NOTE — If smoldering has started, a hole will have formed in the material with its edge glowing red. Blacking without smoldering is ignored.

19.112 Portable heaters are operated as specified in **11** but placed on a softwood surface that is covered with a double layer of bleached cotton gauze having a specific mass of approximately 40 g/m^2. The heater is then pushed so that it overturns in the most unfavourable position.

NOTES

1 Thermal controls that operate during the test of **11** are allowed to operate.

The cotton gauze or the wood surface shall not smoulder or ignite. The temperature of the surface of oil filled radiators shall be at least 40 K lower than the boiling point of the oil. There shall be no deformation of the container, leakage of oil or emission of flames.

2 The pressure in liquid-filled radiators is measured for the test of **22.7**.

3 Sub-clause **19,13** does not apply.

Fuel effect heaters indented to be placed in a fireplace are not subjected to this test.

19.113 Fan heaters having an enclosure subsequently of non-metallic material are operated as specified in **11**, except that all self-resetting thermal cut-outs and controls that operate during the test of **11** are short-circuited and the fan motor is stalled.

NOTE — Motor protectors are not short-circuited.

19.114 A quantity of oil is drained from the container of oil-filled radiators until the oil level is approximately 10 mm above the heating element. The container is then resealed and the appliance operated as specified in **11** but at rated power input.

The temperature of the surface of the container shall be at least 40 K lower than the boiling point of the oil.

NOTE — In order to avoid hazardous conditions, the test should be terminated if the temperature limit is exceeded.

20 STABILITY AND MECHANICAL HAZARDS

This clause of Part 1 is applicable except as follows:

20.1 Replacement

Portable heaters shall have adequate stability.

Compliance is checked by the following test.

Heaters incorporating an appliance inlet are fitted with a cord set. The appliance is placed in the most unfavourable normal position of use in a plane inclined at an angle of 15° to the horizontal.

The appliance shall not overturn.

Appliances having a mass exceeding 5 kg are then placed on a horizontal surface. A force of 5 ± 0.1 N is applied to the top of the appliance in the most unfavourable horizontal direction.

The appliance shall not overturn.

NOTE

101 Suitable means may be used to prevent the appliance from sliding.

21 MECHANICAL STRENGTH

This clause of Part 1 is applicable except as follows:

Addition

Compliance is also checked by the tests of **21.101** and **21.102.**

For appliances with heating elements that are in direct contact with accessible glass panels, the impact energy of the blows applied to the panel is 2.00 ± 0.05 j.

21.101 Visibly glowing radiant heaters other than heaters for mounting at high level are placed so that the central part of the fireguard is horizontal. A mass of 5 kg having a flat base 100 mm in diameter is placed for 1 min on the central part of the fireguard.

After the test, the fireguard shall show no significant permanent deformation.

21.102 Fixed appliances having a hinged part, the movement of which is restricted by chains of similar means, are fixed and the hinged part is allowed to drop under its own weight. This test is carried out five times.

The heater shall show no damage that could impair compliance with this standard, in particular, compliance with **8.1** and **29** shall not be impaired.

21.103 The suspension means of panel heaters for ceiling mounting shall have adequate strength.

Compliance is checked by suspending load equal to four

times the mass of the appliance from the center of the panel for 1 h. If the suspension means are adjustable, the test is carried out with the means fully extended. If the suspension means are rigid, a torque of 2.5 Nm is applied to the panel for 1 min in each direction.

The suspension means shall show no significant deformation.

22 CONSTRUCTION

This clause of Part I is applicable except as follows:

22.7 Replacement

Appliances containing liquid shall be constructed so that they withstand the pressure likely to occur during use.

Compliance is checked by subjecting the appliance to twice the highest pressure measured during the test of **19.101**, **19.103** and **19.112.**

There shall be no leakage of liquid.

22.17 The requirement does not apply to rollers or feet if the appliance complies with **19** without these parts in place.

22.24 Replacement

Bare heating elements shall be supported to prevent excessive displacement occurring during normal use. The rupture of a heating element shall not give to a hazard.

Compliance is checked by inspection and by the following tests:

The heating element is cut in the most unfavourable place. The conductor shall not come into contact with accessible metal parts or fall out of the appliance.

If coiled heating elements are supported by a spring, the conductor is cut at each end close to a point support. A force of 5 N is applied to the spring perpendicular to its axis and midway between the points of support.

The string shall not break.

Additional Sub-clauses

22.101 Heaters, other than heaters for mounting at high level, shall be guarded in order to prevent contact with heating element.

Compliance is checked by inspection by any of the following tests:

Test probe 4 of IS 1401 is applied with a force not exceeding 5 N to the guard. It shall not touch heating element.

The openings in fireguards are measured and shall not exceed:

a) a major dimension of 126 mm and a corresponding minor dimension of 12 mm; and
b) a major dimension of 53 mm and a corresponding minor dimension of 20 mm.

However, any apertures having a minor dimension of less than 5 mm are ignored. These dimensions are applied to any gap between the fireguard and its immediate surround.

22.102 Fireguard shall have a total open area not less than 50 percent of the surface area of the fireguard.

Compliance is checked by measurement.

22.103 Fireguard shall be securely attached to the heater so that it is not possible to detach them completely without the use of a tool.

Compliance is checked by inspection and by manual test.

22.104 Appliances for wall mounting shall be constructed so that they can be securely fixed to the wall.

NOTE — Key-hole slots, hooks and similar means, without any further provision to prevent the heater from being inadvertently lifted off the wall are not considered to be adequate means for fixing the heater securely to the wall.

Compliance is checked by inspection.

22.105 Accessible glass panel in direct contact with heating elements shall withstand thermal shock.

Operating the heater at 1.15 times rated power input until steady condition is established. One litre of 15 ± 5°C is directed on to the central part of the rate of the approximately 10 ml/s through a 5 mm diameter tube.

The panel shall not be damaged.

22.106 Portable appliances 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. The 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 to 20 mm if it is intended to stand on the floor.

22.107 Visibly glowing radiant heaters intended to be fixed to a wall or ceiling shall be constructed so that the direction of radiation cannot be significantly changed without the use of a tool after the heater has been fixed.

NOTE — A limited change in the direction of radiant is allowed if the limits are specified in the instruction.

22.108 Visibly glowing radiant heaters, other than heaters for mounting at high level, shall not incorporate thermostats, timers or similar means which switch on heating elements automatically, unless at least one heating element is already visibly glowing.

Compliance is checked by inspection.

The disconnection of the supply by a switch in the off position shall not rely on electronic components.

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 *Addition*

For switches operating during the test of **19.112,** the number of cycles of operation is 300.

24.1.4 *Modification*

For thermostats of liquid-filled radiators that operate during the test of **11** to limit the surface temperature rise to 85 K, the number of cycles of operation is increased to 100 000.

For self-resetting thermal cut-outs, the number of operations increased to 10 000.

For non-self-resetting thermal cut-outs operating during the test of **19.112,** the number of cycles of operation is increased to 300.

For other non-self-resetting thermal cut-out, the number of cycles of operation is increased to 1 000.

24.101 Devices incorporated in oil-filled radiators in order to comply with **19.114** shall not be self-resetting.

Compliance is checked by inspection.

25 SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS

This clause of Part 1 is applicable except as follows:

25.7 Addition

Supply cords of portable heaters intended to be used in greenhouses shall be polychloroprene sheathed flexible cord.

Supply cord of heater intended to be used on building sites shall not be lighter than heavy polychloroprene sheathed flexible cord.

NOTE

101 For portable oil-filled radiators. Metal parts likely to touch the supply cord in normal use include those parts that are inaccessible to the 75 mm diameter test rod but may come into contact with the cord when it is wrapped around the heater. This does not apply if storage means for the cord are provided.

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

For fan heaters, the microenvironment is pollution degree 3 unless threw 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 Addition

For portable fan heaters, the temperature rise determined during the test of **19** are not taken into account.

30.2.1 *Modification*

The glow-wire test is carried out on enclosures at a temperature of 650°C

30.2.2 Not applicable.

Additional Sub-clauses

30.101 Fan heaters having an enclosure of substantially non-metallic material shall be resistant to fire.

Compliance is checked by inspection and by subjecting the enclosure of the appliance to the needle-flame test of Annex E of Part 1 of this standard.

The needle-flame test is not carried out on material classified as v-0 or v-1 according to IS 11000 (Part 2/ Sec 2), provided that the test sample was no thicker than the relevant part.

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 102 shall constitute the type tests and shall be carried out on a sample selected preferably at random from regular production lot (*see* **5.3**). Before commencement of the tests, the irons 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.

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 tests(s).

101.2 Acceptance Test

The following shall constitute the acceptance tests:

Test	*Clause Reference*
Protection against access to live parts	**8**
Power input and current	**10**
Heating	**11**
Leakage current and electric strength at operating temperature	**13**
Moisture resistance	**15**
Leakage current and electric strength	**16**
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 (*see* **15**).

101.2.1 A recommended sampling procedure for acceptance tests is given in Annex J of IS 302 - 1 : 2006.

101.3 Routine Test

The following shall constitute the routine tests:

Test	*Clause Reference*
Protection against access to live parts	**8**
High voltage	**13.3.2** of IS 302 - 1 : 2007
Provision for earthing	**27**

Table 102 Schedule of Type Tests

(*Clause* 101.1)

Sl No.	Test	Clause Reference
(1)	(2)	(3)
1	Protection against access to live parts	**8**
2	Power input and current	**10**
3	Heating	**11**
4	Leakage current and electric strength at operating temperature	**13**
5	Transient over voltage	**14**
6	Moisture resistance	**15**
7	Leakage current and electric strength	**16**
8	Abnormal operation	**19**
9	Stability and mechanical hazards	**20**
10	Mechanical strength	**21**
11	Construction	**22**
12	Internal wiring	**23**
13	Components	**24**
14	Supply connection and external flexible cord	**25**
15	Terminals for external conductors	**26**
16	Provision for earthing	**27**
17	Screws and connections	**28**
18	Clearances, creepage distances and solid insulation	**29**
19	Resistance to heat and fire	**30**
20	Resistance to rusting	**31**
21	Radiation, toxicity and similar hazards	**32**

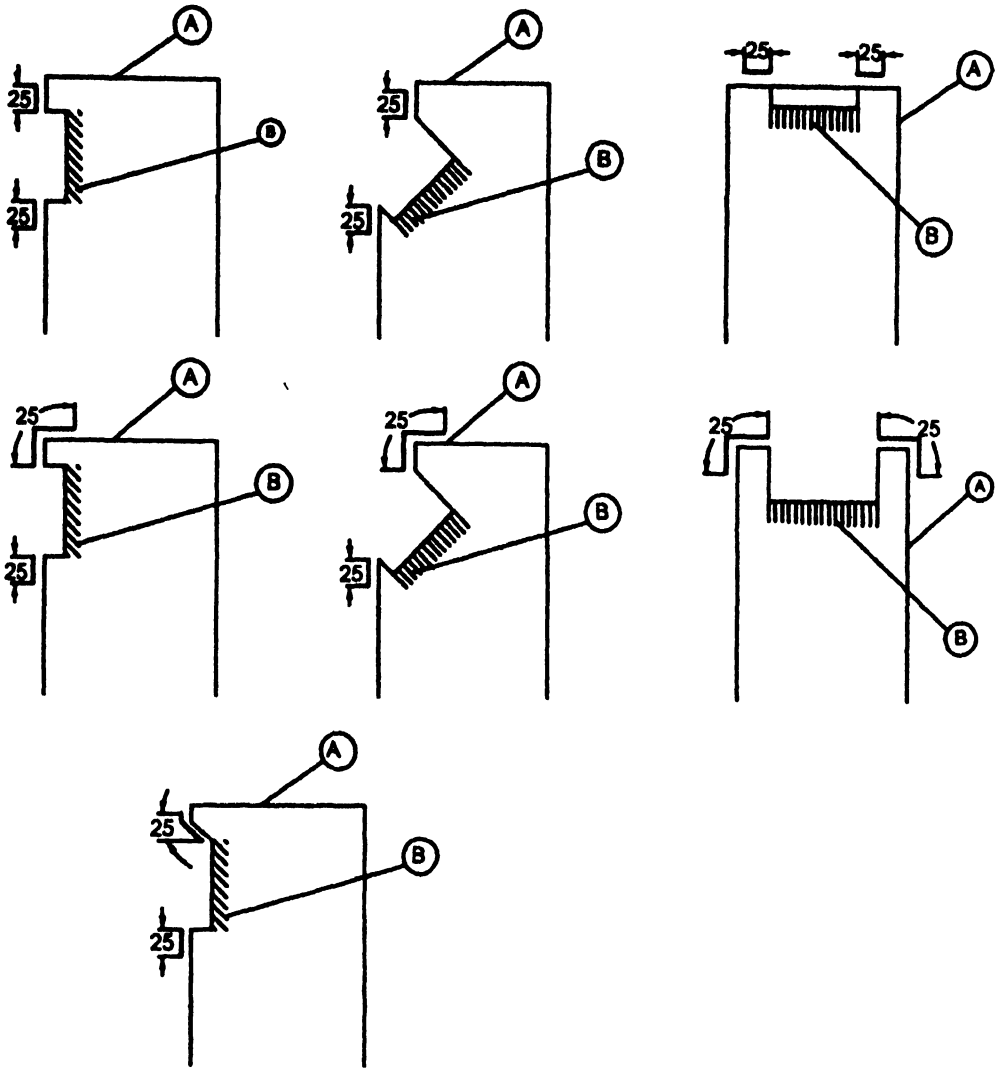

FIG. 101

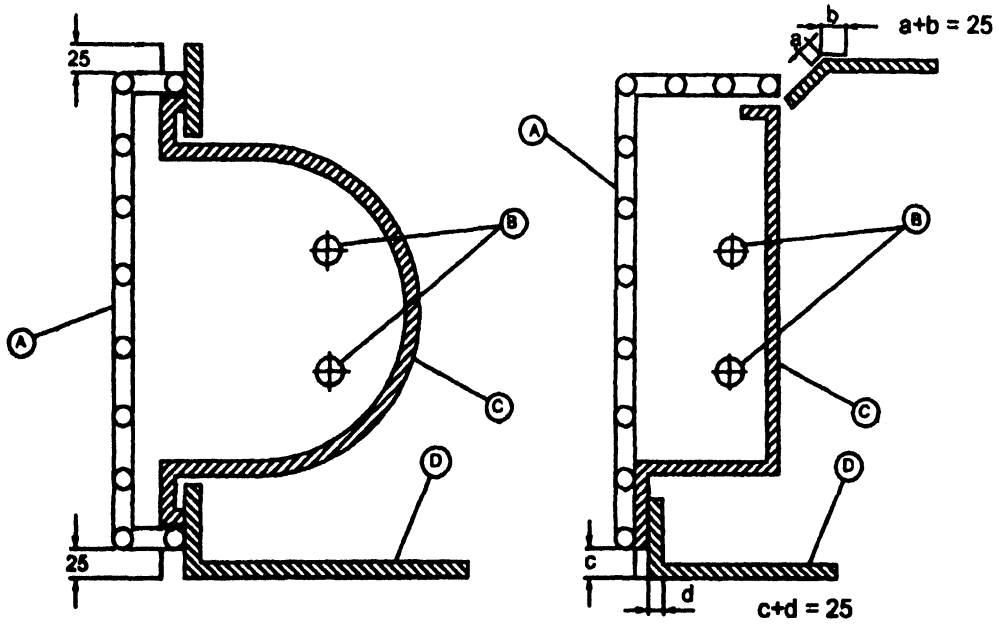

FIG. 102

ANNEXES

The Annexes of Part 1 are applicable.

(*Continued from second cover*)

Clauses/tables which are additional to those of IS 302-1 are numbered starting from **101** and additional sub-clauses are numbered with the main clause number followed by **101**, **1.2**, etc, for example, **7.101.**

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

This standard is based on IRC Pub 60335-2-30 (2002) Safety of household and similar electrical appliance: particular requirements for room heaters, issued by the International Electrotechnical Commission except for the following modification:

a) 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 or analysis, 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.

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Review of Indian Standards

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