**IS 302-2-59 : 2020**

**भारतीय मानक**

घरेलू और समान विद्युतीय उपकरणो की सुरक्षा (पहला पुनरीक्षण)

भाग 2 विशेष अपेक्षाऐं

खंड 59: कीटनाशक

***Indian Standard***

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY

PART 2 PARTICULAR REQUIREMENTS

SECTION 59: Particular requirements for insect killers

(First Revision)

ICS 13.120; 97.180

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**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 59) (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 1999. This revision has been undertaken primarily to align the existing standard with the latest International Standard.

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 internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use considering the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

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.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of IS 302, the relevant Part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE­—  This means that in such a case, it has been decided that for the part 2 standards, it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

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.

NOTE—  Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IS 302 series of standards.

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 the latest edition of IS 302-1 'Safety of household and similar electrical appliances : Part 1 General Requirements' and its amendments. This standard was formulated on the basis of IS 302-1 : 2008.

NOTE — When “Part 1” is mentioned in this standard, it refers to IS 302-1.

This Part 2 supplements or modifies the corresponding clauses in IS 302-1, so as to convert that standard into the Indian standard: Particular requirements for Vacuum cleaners and water-suction cleaning appliances.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. When this standard states addition, modification or replacement, the relevant text in Part 1 is to be adapted accordingly.

NOTE — The following numbering system is used:

1. Subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
2. Unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
3. Additional annexes are lettered AA, BB, etc.

This standard is based on IEC 60335-2-59 : 2009 (Ed. 3.2). As this standard refers to IS 302-1, the differences of IS 302-1 from IEC 60335-1 shall apply.

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.

*Indian Standard*

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –

SAFETY

Part 2 Particular Requirements

Section 59 Particular requirements for insect killers

*(First Revision)*

# SCOPE

This clause of Part 1 is replaced by the following.

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

Appliances not intended for normal household use but that 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

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1. persons (including children) whose
2. physical, sensory or mental capabilities; or
3. lack of experience and knowledge

prevents them from using the appliance safely without supervision or instruction;

1. children playing with the appliance.

NOTE 101 Attention is drawn to the fact that

1. for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
2. 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 102 This standard does not apply to

1. appliances that function by emitting vaporized chemicals;
2. appliances emitting ultrasonic waves;
3. 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).

NOTE 103 For appliances provided with discharge lamps or tungsten filament lamps, IS/IEC 60598-1 also applies as far as is reasonable.

# NORMATIVE REFERENCES

*Addition:*

|  |  |
| --- | --- |
| *IS/ISO/IEC Number* | *Title* |
| IEC 60068-2-52:1996 | *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)* |

# DEFINITIONS

This clause of Part 1 is applicable except as follows.

**3.1.9** *Replacement:*

Normal Operation

operation of the appliance under the following conditions:

1. the output circuit is short-circuited;
2. the grids are separated by the maximum distance for maintaining an arc, the appliance being operated in cycles consisting of 1 s of operation followed by a rest period of 2 s;
3. a resistive load is connected between the grids and adjusted to obtain the maximum current.

3.101

Insect Killer

appliance that electrocutes insects by applying a voltage between two or more grids.

3.102

Effective Irradiance

irradiance of electromagnetic radiation weighted according to a specific action curve.

# GENERAL REQUIREMENT

This clause of Part 1 is applicable.

# GENERAL CONDITIONS FOR THE TESTS

This clause of Part 1 is applicable except as follows.

**5.101**For each test, the most unfavourable condition specified in 3.1.9 is used.

**5.102** Insect killers are tested as motor-operated appliances*.*

# CLASSIFICATION

This clause of Part 1 is applicable except as follows.

**6.1** *Modification:*

Insect killers shall be class I or class II.

**6.2** *Addition:*

Insect killers intended for outdoor use shall be at least IPX4.

# MARKING AND INSTRUCTIONS

This clause of Part 1 is applicable except as follows.

**7.1** *Addition:*

Appliances shall be marked with symbol 5036 of IEC 60417-1 or with the substance of the following:

DANGER: High voltage

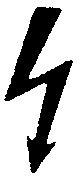
Appliances provided with replaceable lamps shall be marked with the type reference of the lamp.

Appliances containing lamps that cannot be replaced without breaking or destroying the appliance shall be marked with the substance of the following:

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WARNING: The lamps in this appliance cannot be replaced. Scrap the appliance when the lamps cease to operate.

**7.6** *Addition:*

 [symbol 5036 of IEC 60417-1] dangerous voltage

**7.12** *Addition:*

The instructions shall state whether the appliance is for indoor use only or suitable for outdoor use.

The instructions for appliances for indoor use only shall state that they are not suitable for use in barns, stables and similar locations.

The instructions for appliances intended for outdoor use shall include the substance of the following:

WARNING: An electric shock hazard may exist if water from a garden hose is directed at the insect killer.

When using extension cords, keep the socket-outlet away from moisture and avoid damage to the cord.

The instructions shall state the substance of the following:

1. the appliance is to be kept out of reach of children;
2. the appliance is not to be used in locations where flammable vapour or explosive dust is likely to exist.

The instructions shall give details concerning

1. the method and frequency of cleaning, together with the precautions to be taken;
2. precautions to be taken when replacing lamps and starters, if applicable.

If symbol 5036 of IEC 60417-1 is used, its meaning shall be explained.

**7.14***Addition:*

The height of symbol 5036 of IEC 60417-1 shall be at least 10 mm.

The height of the lettering of the warning relating to high voltage shall be at least 3 mm.

Compliance is checked by measurement.

**7.101** **BIS Certification Marking**

The appliances may also be marked with the Standard Mark.

**7.101.1** The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the BIS Act, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

# PROTECTION AGAINST ACCESS TO LIVE PARTS

This clause of Part 1 is applicable except as follows.

**8.1.1** *Addition:*

When the grid voltage is obtained from an isolating transformer, the test probe may touch earthed parts of the secondary circuit.

# STARTING OF MOTOR-OPERATED APPLIANCES

This clause of Part 1 is not applicable.

# POWER INPUT AND CURRENT

This clause of Part 1 is applicable.

# HEATING

This clause of Part 1 is applicable except as follows.

* 1. *Replacement:*

Appliances are operated until steady conditions are established.

**11.8** *Addition:*

The temperature rise of surfaces likely to collect dust or insects shall not exceed 60 K.

NOTE 101 Surfaces having an inclination of at least 60° to the horizontal and parts having a diameter less than 10 mm are not considered likely to collect dust or insects.

# VOID

# LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE

This clause of Part 1 is applicable.

# TRANSIENT OVERVOLTAGES

This clause of Part 1 is applicable.

# MOISTURE RESISTANCE

This clause of Part 1 is applicable except as follows.

**15.1** *Addition:*

Water on the grids is ignored.

# LEAKAGE CURRENT AND ELECTRIC STRENGTH

This clause of Part 1 is applicable except as follows.

**16.101** The transformer shall have adequate internal insulation.

Compliance is checked by the following test.

Twice the working voltage is induced in the secondary winding of the transformer by applying a sinusoidal voltage having a frequency higher than rated frequency to the primary terminals.

The duration of the test is

1. 60 s, for frequencies up to twice the rated frequency, or
2. 120 ×  s, with a minimum of 15 s, for higher frequencies.

NOTE 101 The frequency of the test voltage is higher than the rated frequency to avoid excessive excitation current.

A maximum of one-third of the test voltage is applied and is then rapidly increased without creating transients. At the end of the test, the voltage is decreased in a similar manner to approximately one-third of its full value before switching off.

There shall be no breakdown between windings or between adjacent turns of the same winding.

# OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS

This clause of Part 1 is applicable.

# ENDURANCE

This clause of Part 1 is not applicable.

# ABNORMAL OPERATION

This clause of Part 1 is applicable.

# STABILITY AND MECHANICAL HAZARDS

This clause of Part 1 is applicable.

# MECHANICAL STRENGTH

This clause of Part 1 is applicable.

# CONSTRUCTION

This clause of Part 1 is applicable except as follows.

**22.6** *Addition:*

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

**22.101** Interlock switches that prevent access to live parts during user maintenance shall be connected in the input circuit and located to prevent unintentional operation.

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

**22.102** Appliances having grids in the form of horizontal bars, and one pole of the output of the transformer connected to accessible parts, shall have the lowest bar connected to earth.

Compliance is checked by inspection.

**22.103** Appliances shall be constructed so that there is no risk of electric shock when touching the grids during user maintenance.

Compliance is checked by the following test.

The appliance is supplied at rated voltage. It is then disconnected from the supply mains. One second after disconnection, the voltage between the grids is measured with an instrument that does not appreciably affect the value to be measured.

The voltage shall not exceed 34 V.

**22.104** The short-circuit current of the output circuit shall not be excessive.

Compliance is checked by the following test.

The appliance is supplied at rated voltage. The short-circuit current is measured between both grids and between each grid and earth.

The current shall not exceed 10 mA.

# INTERNAL WIRING

This clause of Part 1 is applicable except as follows.

**23.5***Addition:*

For circuits having a voltage over 1000 V, the test voltage is  V and is applied for 1 min.

NOTE 101 *U* is the peak value of the working voltage.

NOTE 102 The test is only carried out in case of doubt.

# COMPONENTS

This clause of Part 1 is applicable except as follows.

**24.1.3** *Addition:*

Interlock switches are operated 1000 times.

**24.2** *Addition:*

Appliances for indoor use only may be fitted with switches in flexible cords.

**24.101**Interlock switches that prevent access to live parts during user maintenanceshall

1. disconnect all poles, unless the secondary circuit is supplied through an isolating transformer;
2. have a contact separation that provides full disconnection in accordance with IS/IEC 61058-1.

Compliance is checked by inspection.

# SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS

This clause of Part 1 is applicable except as follows.

**25.7** *Addition:*

Supply cords of appliances intended for outdoor use, and of appliances having a lamp emitting ultra-violet radiation, shall be polychloroprene sheathed and not be lighter than ordinary polychloroprene sheathed cord (IS 9968 (Part 1):1988).

# TERMINALS FOR EXTERNAL CONDUCTORS

This clause of Part 1 is applicable.

# PROVISION FOR EARTHING

This clause of Part 1 is applicable.

# SCREWS AND CONNECTIONS

This clause of Part 1 is applicable.

# 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.

# RESISTANCE TO HEAT, FIRE AND TRACKING

This clause of Part 1 is applicable except as follows.

**30.2.2** Not applicable.

**30.101** Parts of non-metallic material enclosing or supporting the grids, and non-metallic trays intended to collect insects, shall be resistant to fire. This also applies to parts within 50 mm above the tray.

Printed boards in the output circuit having a surface area exceeding 25 cm2 shall be resistant to fire, unless they are contained in a metal enclosure.

Compliance is checked by the needle-flame test of Annex E.

The needle-flame test is not carried out on parts of material classified as V-0 or V-1 according to IS/IEC 60695-11-10, provided that the sample tested was not thicker than the relevant part.

# RESISTANCE TO RUSTING

This clause of Part 1 is applicable except as follows.

Addition:

For appliances intended for outdoor use, compliance is checked by the salt mist test of IEC 60068-2-52, severity 2 being applicable.

Before the test, coatings are scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0.25 mm ± 0.02 mm. The pin is loaded so that the force exerted along its axis is 10 N ± 0.5 N. The scratches are made by drawing the pin along the surface of the coating at a speed of approximately 20 mm/s. Five scratches are made at least 5 mm apart and at least 5 mm from the edges.

After the test, the appliance shall not have deteriorated to such an extent that compliance with this standard, in particular with Clauses 8 and 27, is impaired. The coating shall not be broken and shall not have loosened from the metal surface.

# RADIATION, TOXICITY AND SIMILAR HAZARDS

This clause of Part 1 is applicable except as follows.

Addition:

For appliances incorporating lamps emitting UV radiation, compliance is checked by the following test.

The appliance is supplied at rated voltage and operated under normal operation. The irradiance is measured at a distance of 1 m, the measuring instrument being positioned so that the highest radiation is recorded.

NOTE 101 The measuring instrument used measures the mean irradiance over a circular area having a diameter not exceeding 20 mm. The response of the instrument is proportional to the cosine of the angle between incident radiation and the normal to the circular area. The spectral distribution is measured at intervals of 1 nm by means of a spectrophotometer having a bandwidth not exceeding 2.5 nm.

2

NOTE 102 The total effective irradiance is given by



where

*E* is the effective irradiance;

*S*λ is the weighting factor specified in Table 101;

*E*λ is the spectral irradiance in W/(m2nm);

Δλ is the bandwidth in nm.

The irradiance is measured when the radiation from the lamp has stabilized. The effective irradiance for each wavelength is calculated taking into account the weighting factors specified in Table 101.

The total effective irradiance is determined and shall not exceed 1 mW/m2.

Table 101 – Weighting factors for different wavelengths

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Wavelength  nm | Weighting factor (*S*λ) |  | Wavelength  nm | Weighting factor (*S*λ) |  | Wavelength  nm | Weighting factor (*S*λ) |
| 250  254  255  260  265  270  275  280  285  290  295  297  300  303  305 | 0.430  0.500  0.520  0.650  0.810  1.000  0.960  0.880  0.770  0.640  0.540  0.460  0.300  0.120  0.060 | 308  310  313  315  316  317  318  319  320  322  323  325  328  330  333 | 0.026  0.015  0.006  0.003  0.0024  0.0020  0.0016  0.0012  0.0010  0.00067  0.00054  0.00050  0.00044  0.00041  0.00037 | 335  340  345  350  355  360  365  370  375  380  385  390  395  400 | 0.00034  0.00028  0.00024  0.00020  0.00016  0.00013  0.00011  0.000093  0.000077  0.000064  0.000053  0.000044  0.000036  0.000030 |
| NOTE The weighting factors for intermediate wavelengths are determined by interpolation. | | | | | | | |

**101 TESTS**

**101.0 Categories of Tests**

Tests are classified as type, acceptance and routine tests.

**101.1 Type Test**

The tests specified in Table 102 shall constitute the type tests and shall be carried out on two samples of the same type and rating selected preferably at random from a regular production lot. Before commencement of the tests, the vacuum cleaners and water suction cleaning appliances shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction mechanical hazards, markings, provision of suitable terminals for supply connections, earthing and the effectiveness of screw s and connections. The external surface finish shall be even and free from finishing defects.

**101.1.1** *Criteria of Acceptance*

Both samples shall successfully pass all the type tests for proving conformity with the requirements of the standard. If any of the samples 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).

|  |  |  |
| --- | --- | --- |
| **Table 102 Schedule of Type Tests** | | |
| *( Clause 101.1 )* | | |
| Sl. No | 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 |
|  | Transient over voltages | 14 |
|  | Moisture resistance | 15 |
|  | Leakage current and electric strength | 16 |
|  | Overload protection of transformers and associated circuits | 17 |
|  | Abnormal operation | 19 |
|  | Stability and mechanical hazards | 20 |
|  | Mechanical strength | 21 |
|  | Construction | 22 |
|  | Internal wiring | 23 |
|  | Components | 24 |
|  | Supply connection and external flexible cords | 25 |
|  | Terminals for external conductors | 26 |
|  | Provision for earthing | 27 |
|  | Screws and connections | 28 |
|  | Clearances, creepage distances and solid insulation | 29 |
|  | Resistance to heat and fire | 30 |
|  | Resistance to rusting | 31 |
|  | Radiation, toxicity and similar hazards | 32 |
|  |  |  |

**101.2** **Acceptance Tests**

The following shall constitute the acceptance tests:

|  |  |  |
| --- | --- | --- |
| Sl. No | Test | Clause Reference |
| (1) | (2) | (3) |
|  | Protection against access to live parts | 08 |
|  | 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). | | |

**101.3** **Routine Tests**

Annex A of Part 1 shall be applicable for this clause.

**ANNEXES**

The annexes of Part 1 are applicable.