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घरेलू और समान विद्युतीय साधित्रों की सुरक्षा

भाग 2 विशेष अपेक्षाऐं

खंड 4: चक्रण निष्कर्षक

(पहला पुनरीक्षण)

Indian Standard

SAFTEY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

PART 2 PARTICULAR REQUIREMENTS

SECTION 4 SPIN EXTRACTORS

(FIRST REVISION)

ICS 13.120; 97.060; 97.190; 97.200.50

B U R E A U O F I N D I A N S T A N D A R D S
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Electrical Appliances Sectional Committee, ETD 32

FOREWORD

This Indian Standard (Part 2/Sec 4) (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 1993. 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 taking into account 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:

a) Subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

b) 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;

c) Additional annexes are lettered AA, BB, etc.

This standard is based on IEC 60335-2-4 : 2008 (Ed. 6.2). As this standard refers to IS 302-1, the differences of IS 302-1 from IEC 60335-1 shall apply.

The principal changes in this revision are as follows (minor changes are not listed):

a. clarifies criteria for the protection against mechanical hazards for double lid appliances

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.

Doc N0. ETD 32 (17858)

IS 302-2-4: 2021

Indian Standard
SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES
PART 2 PARTICULAR REQUIREMENTS
Section 4 Spin Extractors
(First Revision)

1 SCOPE

This clause of Part 1 is replaced by the following.

This Standard deals with the safety of

a) stand alone electric spin extractors, and

b) spin extractors incorporated in washing machines that have separate containers for washing and spin extraction

for household and similar purposes that have a capacity not exceeding 10 kg of dry cloth and a drum peripheral speed not exceeding 50 m/s, their rated voltages being not more than 250 V for single-phase appliances and 480 V for other appliances.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as spin extractors intended to be used by laymen in shops, in light industry and on farms, and spin extractors for communal use in blocks of flats or in launderettes are within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by appliances which are encountered by all persons in and around the home. However, in general, it does not take into account

a) persons (including children) whose

   1. physical, sensory or mental capabilities; or
   2. lack of experience and knowledge

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

b) children playing with the appliance.

NOTE 101 Attention is drawn to the fact that for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;

NOTE 102 This standard does not apply to

a) appliances intended exclusively for industrial/commercial purposes;

b) 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:

ISO/IEC Number	*Title*
IEC 60730-2-12:2005	Automatic electrical controls for household and similar use – Part 2: Particular requirements for electrically operated door locks

3 TERMS AND 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

The drum is filled with textile material having a mass in the dry condition equal to the maximum mass specified in the instructions. The textile material consists of pre-washed double hemmed cotton sheets having dimensions of approximately 700 mm × 700 mm and a specific mass between 140 g/m^2 and 175 g/m^2 in the dry condition. It is saturated with cold water before being evenly distributed in the drum.

As an alternative to the textile material specified, pieces of cloth having an area between 1 4 800 cm2 and 5 000 cm2 with one side of at least 55 cm may be used for the tests. Additional Sub-clause

2.101 Spin Extractor
A water extracting machine in which water is removed from textile material by centrifugal force.

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:*

The tests of 21.101, 21.102 and 22.101 shall be carried out on the same appliance as that used for the test of Clause 18.

5.3 *Addition:*

The tests of 21.101 and 21.102 are carried out before the test of Clause 18. The test of 22.101 is carried out after the test of Clause 18.

6 CLASSIFICATION

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Appliances shall be class I, class II or class III.

6.2 *Addition:*

Appliances shall be at least IPX4.

7 MARKING AND INSTRUCTIONS

This clause of Part 1 is applicable except as follows.

7.10 *Addition:*

If the off position is only indicated by letters, the word "off" shall be used.

7.12 *Addition:*

The instructions shall specify the maximum mass of dry cloth in kilograms, to be used in the appliance.

7.12.1 *Addition*:

If the label specified in 7.101 is supplied with the appliance, the installation instructions shall state that it has to be permanently fixed to the wall close to the appliance.

For appliances intended for communal use in blocks of flats, and having an interlock system that has to be energized in order to release the lid, the installation instructions shall state that a device for switching off the appliance automatically is not to be installed in the supply circuit.

7.101 Appliances intended for communal use in blocks of flats, and having an interlock system that has to be energized in order to release the lid, shall be supplied with a label that states the substance of the following, unless the instruction is marked on the appliance:

'This spin extractor has to be connected to the supply mains before the lid can be opened. Do not force it open.'

7.102 BIS CERTIFICATION MARKING

7.102.1 The appliances may also be marked with the Standard Mark.

7.102.2 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.

8 PROTECTION AGAINST ACCESS TO LIVE PARTS

This clause of Part 1 is applicable.

9 STARTING OF MOTOR-OPERATED APPLIANCES

This clause of Part 1 is not applicable.

10 POWER INPUT AND CURRENT

This clause of Part 1 is applicable.

11 HEATING

This clause of Part 1 is applicable except as follows.

11.7 *Replacement:*

Appliances are operated for five periods of water extraction, the periods being separated by a rest period. Each rest period, which includes the braking time, has a duration of 1 min for each kilogram of dry textile material or 4 min, whichever is longer. During the rest period, the textile material is re-saturated with water.

For appliances incorporating a programmer or timer, the water extraction period is the maximum allowed by the control.

For other appliances, the water extraction period has a duration of

a) 15 min for continuous-flow rinsing appliances;

b) 5 min for other appliances.

If a longer period is indicated in the instructions, this period applies instead.

If the spin extractor is designed for continuousflow rinsing, water is allowed to flow continuously through the textile material during the water extraction periods, in accordance with the manufacturer’s instructions.

12 VOID

13 LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE

This clause of Part 1 is applicable.

14 TRANSIENT OVERVOLTAGES

This clause of Part 1 is applicable.

15 MOISTURE RESISTANCE

This clause of Part 1 is applicable except as follows.

15.2 *Addition:*

The inlet to the discharge pump or to the gravity drain is blocked. The drum is filled as specified for normal operation, the mass of water being thrice the mass of the dry textile material. Any water remaining after the saturation process is poured into the appliance, which is supplied at rated voltage and operated for 1 min or the maximum period allowed by the programmer or timer, whichever is shorter.

In addition, continuous-flow rinsing appliances having a vertical axis are completely filled with saturated textile material and 10 litre of water is poured in over a period of 20 s, once while the appliance is operating and once while the container is at rest. The appliance is operated while supplied at rated voltage.

For all appliances, 0.5 l of the solution is poured rapidly over the top of the appliance *in* the most unfavourable way so that the spillage solution also flows over the surface of the appliance that incorporate controls and other places where it may penetrate the appliance enclosure, the controls being placed in the most unfavourable position. The controls are then operated through their working range, this operation being repeated after 5 min.

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

Appliances having lids that can be opened while the drum is rotating shall be constructed so that braking mechanisms and lid interlocks withstand the stresses to which they may be exposed in normal use.

Compliance is checked by the following test.

The appliance is supplied at 1.06 times rated voltage and operated under normal operation until the motor has reached its maximum speed.

The lid is then fully opened. The test is repeated after the drum has been at rest for a period long enough to ensure that the appliance does not attain an excessive temperature.

The test is carried out

a) for braking mechanisms:
   1. 3 500 times for separate spin extractors;
   2. 1 000 times for spin extractors incorporated in washing machines;

b) for lid interlocks, 6 000 times.

The textile material is re-saturated with water at least every 250 times.

After the test, the appliance shall be fit for further use and compliance with this standard shall not be impaired.

NOTE 101 Forced cooling may be used to prevent excessive temperatures and to shorten the test.

19 ABNORMAL OPERATION

This clause of Part 1 is applicable except as follows.

19.7 Not applicable.

19.9 Not applicable.

20 STABILITY AND MECHANICAL HAZARDS

This clause of Part 1 is applicable except as follows.

20.1 *Addition:*

The drum is empty, or filled as specified for normal operation, whichever is more unfavourable.

20.101 Appliances shall not be adversely affected by an unbalanced load.

Compliance is checked by the following test.

The appliance is placed on a horizontal support and a load having a mass of 0.2 kg or 10 % of the maximum mass of textile material specified in the instructions, whichever is higher, is fixed to the inside wall of the drum half-way along its length.

The appliance is supplied at rated voltage and operated for 5 min or the maximum period allowed by a programmer or timer, whichever is shorter.

The test is carried out four times, the load being moved each time through an angle of 90° around the wall of the drum.

If compliance relies on the operation of an electronic circuit, the test is repeated with the fault conditions in a) to f) of 19.11.2 applied one at a time to the electronic circuit.

The appliance shall not overturn and the drum shall not hit other parts except the enclosure.

After the test, the appliance shall be fit for further use.

20.102 The lid or door shall be interlocked so that the appliance can only be operated when the lid or door is in the closed position.

Compliance is checked by inspection, by manual test and by the following test.

Test probe B of IS 1401 is applied in order to try and release any interlock that is needed to comply with the requirement. The interlock shall not release.

20.103 For appliances having a drum with a rotational kinetic energy exceeding 1 500 J, or

for appliances having a single lid, a maximum peripheral speed exceeding 20 m/s,

for appliances incorporating two lids, a maximum peripheral speed exceeding 25 m/s,

it shall not be possible to open the lid while the drum is in motion.

Compliance is checked by inspection, by measurement of the maximum peripheral speed, by calculation of the rotational kinetic energy and by the following test.

The appliance is supplied at rated voltage and operated empty. The force determined during the test of 22.101 with the lid interlocked is applied to the lid in an attempt to open it.

If compliance relies on the operation of an electronic circuit, the test is repeated under the following conditions applied separately:

a) the fault conditions in a) to f) of 19.11.2 applied one at a time to the electronic circuit;

b) the electromagnetic phenomena tests of 19.11.4.1 to 19.11.4.4 applied to the appliance.

In an appliance containing lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that the following conditions are fulfilled:

a) the lid or door does not move automatically to an open position when the interlock is released; and

b) the appliance will not restart after the cycle in which the interlock was released.

It shall not be possible to open the lid while the drum is in motion.

If the drum is not cylindrical, the peripheral speed is the mean peripheral speed.

NOTE 101 the rotational kinetic energy is calculated from the following formula:

$$E = \frac{mv^2}{4}$$

where

E is the rotational kinetic energy, in J;

m is the mass of the cloth specified in the instructions for use, in kg;

v is the maximum peripheral speed of the drum, in m/s.

If the electronic circuit is programmable, the software shall contain measures to control the fault/error conditions

20.104 For appliances having a drum with a rotational kinetic energy not exceeding 1 500 J and

a) for a appliances having a single lid, a maximum peripheral speed not exceeding 20 m/s,

b) for appliances incorporating two lids, a maximum peripheral speed not exceeding 25 m/s,

moving parts shall not be accessible while the motor is energized or when the drum speed exceeds 60 r/min.

The braking system shall not be affected by the penetration of water.

Compliance is checked by measurement of the maximum peripheral speed, by calculation of the rotational kinetic energy and by the following test, which is carried out after repeating the spillage test of 15.2.

NOTE 102 The rotational kinetic energy is calculated in accordance with the formula in 20.103.

The appliance is supplied at rated voltage and operated empty. For appliances having a single lid and for appliances incorporating two lids where the second lid does not open independently of the first lid, the lid or first lid as appropriate is gradually opened and

a) with an opening of 4 mm to 10 mm, it shall not be possible to touch parts rotating at a speed exceeding 60 r/min with the test probe 12 of IEC 61032;

b) with an opening greater than 10 mm, but not more than 12 mm, it shall not be possible to touch parts rotating at a speed exceeding 60 r/min with a test rod 3 mm in diameter and 120 mm long. In addition, the test probe B of IEC 61032 is applied and shall not come within a distance of 20 mm from the rotating parts;

c) with an opening greater than 12 mm, the motor shall be disconnected from the supply and within 7 s, the drum speed shall not exceed 60 r/min.

For appliances incorporating two lids where the second lid opens independently of the first lid, the first lid is gradually opened and with an opening greater than 50 mm, the motor shall be disconnected from the supply and within 2 s the drum speed shall not exceed 20 m/s.

The second lid is gradually opened and

a) with an opening of 4 mm to 10 mm, it shall not be possible to touch parts rotating at a speed exceeding 60 r/min with the test probe 12 of IEC 61032;

b) with an opening greater than 10 mm, but not more than 12 mm, it shall not be possible to touch parts rotating at a speed exceeding 60 r/min with a test rod 3 mm in diameter and 120 mm long. In addition, the test probe B of IEC 61032 is applied and shall not come within a distance of 20 mm from the rotating parts;

c) with an opening greater than 12 mm and within 7 s, the drum speed shall not exceed 60 r/min.

If compliance relies on the operation of an electronic circuit, the test is repeated under the following conditions applied separately:

a) the fault conditions in a) to f) of 19.11.2 applied one at a time to the electronic circuit;

b) the electromagnetic phenomena tests of 19.11.4.2 applied in turn to the appliance.

In an appliance containing lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that the following conditions are fulfilled:

a) the lid or door does not move automatically to an open position when the interlock is released; and

b) the appliance will not restart after the cycle in which the interlock was released.

If the electronic circuit is programmable, the software shall contain measures to control the fault/error conditions.

20.105 Protective devices fitted in the upper part of spin extractors having a vertical axis shall be positioned or protected so that the device is not likely to be damaged by textile material that may escape from the drum in normal use.

Compliance is checked by inspection.

21 MECHANICAL STRENGTH

This clause of Part 1 is applicable except as follows.

21.101 Lids of appliances shall have adequate mechanical strength.

Compliance is checked by the following test.

A rubber hemisphere having a diameter of 70 mm and a hardness between 40 IRHD and 50 IRHD is fixed to a cylinder having a mass of 20 kg and dropped from a height of 100 mm onto the centre of the lid.

The test is carried out three times, after which the lid shall not be damaged to the extent that moving parts become accessible.

21.102 Lids and their hinges shall have adequate resistance to distortion.

Compliance is checked by the following test.

A force of 50 N is applied to the open lid in the most unfavourable direction and position.

The test is carried out three times, after which the hinges shall not have worked loose and the appliance shall not be damaged or deformed to such an extent that compliance with the appropriate requirements of 20.102 to 20.104 is impaired.

22 CONSTRUCTION

This clause of Part 1 is applicable except as follows.

22.101 Interlocks shall be constructed so that lids or doors are unlikely to be forced open in normal use.

Compliance is checked by the following test.

The lid or door is opened manually as in normal use, the force applied being measured. The lid or door is closed and interlocked. An attempt is then made to open the lid or door in the same way.

It shall not be possible to force open the lid or door with a force less than 10 times the value originally measured, with a minimum of 50 N.

NOTE 101 The test is not carried out if the interlock is not required for compliance with Clause 20.

23 INTERNAL WIRING

This clause of Part 1 is applicable.

24 COMPONENTS

This clause of Part 1 is applicable except as follows.

24.1.4 *Modification:*

The number of cycles of operation for timers is increased to 10 000.

Addition:

For lid interlocks, the number of cycles of operation declared for Subclauses 6.10 and 6.11 of IEC 60730-2-12 shall not be less than 6 000.

25 SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS

This clause of Part 1 is applicable.

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.

30 RESISTANCE TO HEAT AND FIRE

This clause of Part 1 is applicable except as follows.

30.2.3 Not applicable.

31 RESISTANCE TO RUSTING

This clause of Part 1 is applicable.

32 RADIATION, TOXICITY AND SIMILAR HAZARDS

This clause of Part 1 is applicable.

101 TESTS

101.0 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
i)	Protection against access to live parts	8
ii)	Power input and current	10
iii)	Heating	11
iv)	Leakage current and electric strength at operating temperature	13

v)	Transient over voltages	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 connection and external flexible cords	25
xvii)	Terminals for external conductors	26
xviii)	Provision for earthing	27
xix)	Screws and connections	28
xx)	Clearances, creepage distances and solid insulation	29
xxi)	Resistance to heat and fire	30
xxii)	Resistance to rusting	31

101.2 Acceptance Tests

The following shall constitute the acceptance tests:

Sl. No	Test	Clause Reference
(1)	(2)	(3)
i)	Protection against access to live parts	08
ii)	Power input and current	10
iii)	Heating	11
iv)	Leakage current and electric strength at operating temperature	13
v)	Moisture resistance	15
vi)	Leakage current and electric strength	16
vii)	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 except as follows.

ANNEX C
(normative)

AGEING TEST ON MOTORS

Modification:

The value of *p* in Table C.1 is 2 000.