

भारतीय मानक

घरेलू और समान विद्युत साधित्रों की सुरक्षा

भाग 2 विशेष अपेक्षाएँ

खंड 201 बिजली के निमज्ज्य वाटर हीटर

(पहला पुनरीक्षण)

Indian Standard

**SAFETY OF HOUSEHOLD AND SIMILAR
ELECTRICAL APPLIANCES**

PART 2 PARTICULAR REQUIREMENTS

Section 201 Electric Immersion Water Heaters

(First Revision)

ICS 13.260; 97.100.10

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Part 2/Sec 201) (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 1992. The first revision of this standard has been undertaken primarily to align the existing standard with latest International Standard.

This standard covers the safety requirements of electric immersion water heater. This standard however does not cover the performance requirements, which is covered under a separate standard [IS 368 : 1992 'Electric immersion water heaters (*fourth revision*)'].

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

This standard recognizes the 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 Part 2, and to appliances designed on new principles.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features, which impair the level of safety, covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

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

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

Replacement — followed by the new text.

Any addition to the existing provision of a sub-clause of IS 302-1 : 2008 has been indicated as under:

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

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Indian Standard

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

PART 2 PARTICULAR REQUIREMENTS

Section 201 Electric Immersion Water Heaters

(*First Revision*)

1 SCOPE

This clause of Part 1 is replaced by:

This standard deals with the safety of portable electric immersion heaters for household and similar purpose, their rated voltage being not more than 250 V.

Appliances not intended for normal household use, but which nevertheless may be a source of danger to the public, such as appliance 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, which are encountered by all persons in and around the home.

This standard, does not in general, takes into account,

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

NOTES

1 Attention is drawn to the fact that:

- i) for appliances intended to be used in vehicles or on board ships or aircraft, additional requirement may be necessary;

2 This standard does not apply to:

- a) appliances intended exclusively for industrial purpose;
- 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);
- c) heating elements incorporated in portable appliances, such as appliances for heating liquids (IS 302-2-15);
- d) aquarium heaters; and
- e) fixed immersion heaters.

2 REFERENCES

This clause of Part 1 is applicable except as follows:

Addition

IS No.	Title
302-1 : 2008	Safety of household and similar electrical appliances: Part 1 General requirements

IS No.

Title

302-2-15: 1993	Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 15 Appliances for heating liquids
4159 : 2002	Mineral filled sheathed heating elements (<i>third revision</i>)

3 TERMINOLOGY

This clause of Part 1 is applicable except as follows:

3.1.9 Replacement

Normal Operation — Operation of the appliance in a vessel filled with water to the maximum depth of immersion.

4 GENERAL REQUIREMENT

This clause of Part 1 is applicable.

5 GENERAL CONDITION FOR THE TESTS

This clause of Part 1 is applicable except as follows:

5.3 Addition

The additional test of 21 is carried out before the test of 8.

6 CLASSIFICATION

This clause of Part 1 is applicable except as follows:

6.2 This clause of Part 1 is applicable.

7 MARKING AND INSTRUCTIONS

This clause of Part 1 is applicable except as follows:

7.1 Addition

Appliances shall be marked with the maximum and minimum depths/levels of immersion.

NOTES

101 The depths of immersion may be indicated by lines only provided that they are explained in the instructions.

IS 302-2-201 : 2008

102 The marking is not required on appliances intended to float.

7.12 Addition

The instructions shall include the substance of the following:

- a) Details of suitable vessels to be used;
- b) Unplug the immersion heater before removing it from the liquid; and
- c) After unplugging, the heating element will remain hot and should not be touched or placed on combustible surface.

7.101 BIS Certification Marking

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 a licence for the use of Standard Mark may be granted to the manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 PROTECTION AGAINST ACCESS TO LIVE PARTS

This clause of Part 1 is applicable.

9 STARTING OF MOTOR-OPERATED APPLIANCES

This clause of Part 1 is not applicable.

10 POWER INPUT AND CURRENT

This clause of Part 1 is applicable.

11 HEATING

This clause of Part 1 is applicable except as follows:

11.7 Addition

Appliances are operated for 15 min after the water temperature has reached 95°C. However, if this temperature cannot be attained, the immersion heater is operated for 15 min after the water temperature has stabilized, or for 15 min after a thermal control has operated.

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.

16 LEAKAGE CURRENT AND ELECTRIC STRENGTH

This clause of Part 1 is applicable.

17 OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS

This clause of Part 1 is applicable.

18 ENDURANCE

This clause of Part 1 is not applicable.

19 ABNORMAL OPERATION

This clause of Part 1 is applicable except as follows:

19.1 Addition

Only appliances intended to prevent water from freezing in animal troughs are subjected to the tests of 19.4 and 19.5.

19.2 Addition

Appliances are placed or hanged on the floor of the test corner in the most unfavourable position.

19.13 Addition

A temperature rise of 200 K is allowed during the first minute of operation for the walls and floor of the test corner.

20 STABILITY AND MECHANICAL HAZARDS

This clause of Part 1 is applicable.

21 MECHANICAL STRENGTH

This clause of Part 1 is applicable except as follows:

Addition

The appliance is dropped from a height of 1 m onto a hardwood board having a thickness of 50 mm. It is dropped four times, once on the handle, once on the end of the heating element and twice from a horizontal position.

22 CONSTRUCTION

This clause of Part 1 is applicable.

23 INTERNAL WIRING

This clause of Part 1 is applicable.

24 COMPONENTS

This clause of Part 1 applicable except as follows:

Addition

24.101 Thermal cut-outs incorporated in appliances

in order to comply with 19 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:

25.5 Modification

Type Z attachment is allowed.

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, FIRE AND TRACKING

This clause of Part 1 is applicable except as follows:

30.1 Addition

For appliances intended to prevent water from freezing in animal troughs, 30.2.3 is applicable. For other appliances, 30.2.2 is applicable.

31 RESISTANCE TO RUSTING

This clause of Part 1 is applicable.

32 RADIATION, TOXICITY AND SIMILAR HAZARDS

This clause of Part 1 is applicable.

101 TESTS

101.1 Type Tests

The tests specified in Table 101 shall constitute the type tests and shall be carried out on a sample selected 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).

Table 101 Schedule of Type Tests
(Clause 101.1)

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

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 hours while conducting the test for moisture resistance (see 15).

IS 302-2-201 : 2008

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

101.3 Routine Test

The following shall constitute the routine tests:

<i>Test</i>	<i>Clause Reference</i>
Protection against electric access to live parts	8
High voltage	13.3.2 of IS 302-1
Earthing connection	27

ANNEXURES

The Annexures of Part 1 are applicable.

(Continued from second cover)

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

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

This standard is based on IEC Pub 60335-2-74 (2002-10), second edition 'Safety of household and similar electrical appliances: Particular requirements for portable immersion heaters' issued by the International Electrotechnical Commission except for the following modifications:

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

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test 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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Amendments Issued Since Publication

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