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IS 2994 (1992): Electric stoves [ETD 32: Electrical Appliances]

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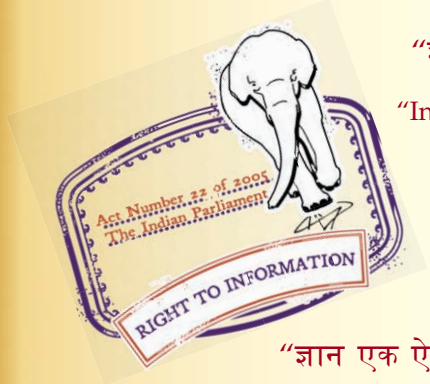

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"Knowledge is such a treasure which cannot be stolen"

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IS 2934 : 1992
(Reaffirmed 2004)

भारतीय मानक

बिजली के चूल्हे – विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

ELECTRIC STOVES — SPECIFICATION

(Second Revision)

UDC 641·535·2

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1992

Price Group 2

FOREWORD

This Indian Standard (Second 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 covers the general safety and performance requirements of electric stoves.

This standard was published in 1965. As per the decision of the third meeting of Electrotechnical Division Council a separate safety standard on electric stoves has been brought out. In the second revision of this composite standard instead of giving details of safety requirements, reference has been made to separate safety standard IS 302-2-202 (1992) 'Safety requirements for household and similar electrical appliances: Part 2 Particular requirements, Section 202 Electric stoves'. This second revision has been undertaken to have composite standard by stating and defining the principal performance characteristics of electric stoves for household and similar use which are of interest to user and to describe methods for measuring the characteristics.

While preparing this standard assistance have been derived from the following:

CEE 11-1954 Electric cooking and heating appliances for domestic and similar purpose. International Commission on Rules for the Approval of Electrical Equipment.

SABS : 153-1958 Electric stoves and hot plates, South African Bureau of Standards.

BS 3456 : Section A-1 : 1961 Heating and cooking appliances, Section A-1 General requirements. British Standards Institution.

IEC 335-1 (1976) Safety for household and similar electrical appliances, Part 1 General requirements. International Electrotechnical Commission.

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.

The thermal efficiency value given in **12** of this standard is based on the studies and testing made. This value is likely to be reviewed at a later date based on the feed back from the industry, testing laboratories and users.

Indian Standard

ELECTRIC STOVES — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard covers the general safety and performance requirements and methods of test for electrically heated stoves, containing open type heating elements, designed for connection to supplies at voltages not exceeding 250 Volt, ac single phase 50 Hz or dc.

1.1.1 This standard does not cover multiunit type electric stoves having more than one heating unit.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
302-2-202 (1992)	Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 202 Electric stoves
302-1 (1979)	Safety of household and similar electrical appliances: Part 1 General requirements

3 TERMINOLOGY

3.1 Clause 2 of IS 302-2-202 (1992) shall apply.

4 GENERAL REQUIREMENTS

4.1 Clause 3 of IS 302-2-202 (1992) shall apply.

5 GENERAL NOTES ON TESTS

5.1 Clause 4 of IS 302-2-202 (1992) shall apply.

6 RATINGS

6.1 Clause 5 of IS 302-2-202 (1992) shall apply.

7 CLASSIFICATION

7.1 Clause 6 of IS 302-2-202 (1992) shall apply.

8 MARKING

8.1 Clause 7 of IS 302-2-202 (1992) shall apply.

9 SAFETY REQUIREMENTS

9.1 The electric stoves shall comply with the requirements as given in clause 8 to clause 32 of IS 302-2-202 (1992) except for clauses 9, 14, 17 and 32.

10 ENDURANCE TEST

10.1 Electric stoves shall be so constructed, that in normal use, there shall be no electrical or mechanical failure that might impair compliance with this standard. The insulation shall not be damaged and contacts and connections shall not work loose as a result of heating, vibration etc.

10.2 The electric stove shall be connected to the supply under conditions of adequate heat discharge [*see* **2.29** of IS 302-2-202 (1992)] such that the input is 1·15 times the maximum rated input which shall be maintained for 96 hours.

10.3 After the test of **10.2**, the electric stove shall withstand the electric strength test given in **16.4** of IS 302-1 (1979).

11 FINISH

11.1 The external finish used on metal components shall be of a heat and moisture resisting nature and shall not be adversely affected by variation in temperature occurring under normal operating conditions or after the endurance test.

Compliance shall be checked by visual inspection after endurance test specified in **10.**

11.2 Ferrous parts, the rusting of which might cause the appliance to fail to comply with this standard, shall be adequately protected against rusting.

Compliance is checked by the following test :

All grease is removed from the parts to be tested by immersion in carbon tetrachloride or trichlorethane for 10 minutes.

The parts are then immersed for 10 minutes in a 10 percent solution of ammonium chloride in water at a temperature between 15°C and 35°C.

Without drying, but after shaking off any drops, the parts are placed for 10 minutes in a box containing air having not less than 90 percent RH and temperature between 15°C and 35°C.

After the parts have been dried for 10 minutes in a heating cabinet at a temperature of 100 ± 5°C, their surfaces shall show no signs of rust.

Traces of rust on sharp edges and any yellowish film removable by rubbing are ignored.

For small helical springs and the like, and for parts exposed to abrasion, a layer of grease may provide sufficient protection against rusting. Such parts are only subjected to the test if there is doubt about the effectiveness of the grease film, and the test is then made without previous removal of the grease.

12 THERMAL EFFICIENCY

12.1 When tested in accordance with Annex A, the thermal efficiency shall not be less than 60 percent.

12.2 In case the efficiency marked on the electric stove is higher than 60 percent, a tolerance of −10 percent shall be allowed on value subject to the provision that the actual efficiency shall in no case fall below 60 percent.

13 TESTS

13.0 Categories of Tests

Tests are classified as type, routine and acceptance tests.

13.1 Type Tests

The tests specified in Table 1 shall constitute the type tests and shall be carried out on two samples of electric stoves of the same type and rating selected preferably at random from a regular production lot. Before commencement of the tests, the electric stoves shall be visually examined and inspected for obvious visual defects in respect of components parts and their assembly construction, stability, marking, provision of suitable terminals for supply connection, earthing and the effectiveness of screws and connections. The external surface finish shall be even and free from finishing defects.

13.1.1 *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 tests(s) in which failure(s) occurred. No failure shall be permitted in the repeat test(s).

Test	*Clause Reference*
a) Protection against electric shock	**8** of IS 302-2-202 (1992)
b) Input	**10** of IS 302-2-202 (1992)
c) Temperature-rise	**11** of IS 302-2-202 (1992)
d) Insulation resistance and electric strength at operating temperature	**13** of IS 302-2-202 (1992)
e) Moisture resistance	**15** of IS 302-2-202 (1992)
f) Insulation resistance and electric strength (After humidity treatment)	**16** of IS 302-2-202 (1992)
g) Earthing connection	**27** of IS 302-2-202 (1992)
h) Thermal efficiency	**12**

13.2.1 A recommended sampling procedure for acceptance test is given in Appendix B of IS 302-1 (1979).

13.3 Routine Tests

The following tests constitute the routine tests:

Test	*Clause Reference*
a) Protection against electric shock	**8** of IS 302-2-202 (1992)
b) High coltage	**13.3.2** of IS 302-1 (1979)
c) Earthing connection	**27** of IS 302-2-202 (1992)

Table 1 Schedule of Type Tests

(*Clause* 13.1)

Sl No.	Test	Clause Reference
1.	Safety requirements	8, 10 to 13, 15, 16, 18 to 31 of IS 302-2-202 (1992)
2.	Endurance	10
3.	Finish	11
4.	Thermal efficiency	12

ANNEX A

(*Clause* 12.1)

TEST FOR THERMAL EFFICIENCY

A-1 TEST ARRANGEMENT

A-1.1 The electric stove shall be mounted 200 mm above a wooden supporting surface (test table) on heat insulated supports. It shall be shielded by a suitable antidraught screen which should be of a height extending from the test table to the top of test vessel. The screen should not be allowed to induct the draught by acting as a chimney, the supports shall be arranged to provide maximum of free air space under the stove.

A-1.2 The test vessel described in **2.29** of IS 302-2-202 (1992) shall be used for the test.

A-2 TEST PROCEDURE

A-2.1 The test vessel containing 1·5 litres per kilowatt rating of the appliances, of water shall be placed centrally on the stove. The initial temperature of the water shall be noted. The stove shall be connected to the source of supply, the circuit having been adjusted to given rated input.

A-2.2 During the heating up period, water shall be continuously stirred and its temperature measured. When the water temperature is nearly 50°C above the initial temperature of the water, its temperature T_2°C just prior to the addition of an extra quantity of water as specified in **A-2.3** shall be accurately noted.

A-2.3 A quantity of water equal to 0·75 litre per kilowatt rating of the appliance whose actual mass M in kg and initial average temperature T_1°C are accurately known, shall then be poured into the test vessel, and the heating continued, measurement of electrical input energy in kilowatt-hours having began from this instant. The heating and stirring shall be continued till the whole mass of water again reached the temperature T_2°C when the measurement of input energy shall be discontinued. The electrical energy consumed during this period E in kilowatt-hours is noted.

A-2.4 The test shall be repeated with the test vessel rotated through 180° relative to the position in the first test.

A-3 CALCULATION OF THERMAL EFFICIENCY

A-3.1 The thermal efficiency, which is the ratio of heat absorbed by water to the equivalent of electrical energy supplied expressed as a percentage shall be computed as follows:

$$\text{Thermal efficiency} = \frac{MS\,(T_2 - T_1)}{860 \times E} \times 100$$

where

M = Mass of water added in kg,

S = Specific heat of water in cal/deg C,

T_2 = Final temperature of the water,

T_1 = Initial temperature of the water,

E = Electrical energy input, and

860 = Heat equivalent to 1 kWh of electrical energy.

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