

Unofficial Translation

In the event of any doubt or misunderstanding arising from this translation, the standard in Thai will be held to be authoritative

TIS 870-2532 (1989) Thai Industrial Standard For Electric Stoves ; Open Type Heating Elements: Safety Requirements

1. Scope

- 1.1 This standard specifies components and construction, requirements, marking and labelling sampling and criteria for conformity, and testing for electric stoves ; open type heating elements.
- 1.2 This standard only covers safety requirements for electric stoves containing open type heating elements, designed for connection to supplies at voltages not exceeding 250 volt, ac single phase 50 Hz or dc, rated power not exceeding 2 kW, and may have more than one heating elements. This standard does not cover electric stove containing closed or embedded type heating element.

2. Definitions

For the purpose of this standard, the following definitions apply.

- 2.1 open type heating elements electric stove, hereinafter referred to as electric stove : electric stoves containing open type heating elements placed in furrow of supporting plate which made of ceramic or other insulated material and designed for placing the utensile for cooking.
- 2.2 heating element : resistant wire which can be electrically heated.
- 2.3 heating unit : the unit consists of heating elements and supporting plate.
- 2.4 test corner : the corner consists of two walls at right angle, a floor and, if necessary, a ceiling, all of dull-black painted plywood having a thickness of 20 mm.
- 2.5 removable part : part which can be removed without the aid of tool.

3. Components and construction

3.1 General requirements

Electric stoves shall have adequate strength and be of good quality material. And shall have protection against electric shock may be expected from heating elements.

- 3.1.1 Heating units shall be so designed that the heating elements can be suitably fitted with supporting plate and can be proper used. The supporting plate shall have locking part in order to prevent the heating element not to come away from its position during normal use or moving the electric stove.
- 3.1.2 Terminal for cords and terminal for heating elements shall be of material resistant to heat, corrosion, or shall be rendered rustproof.

3.2 Handle and stand

Shall be electrical insulation and thermal insulation.

4. Requirements

4.1 Protection against electric shock

- 4.1.1 Standard test finger shall not contact with live parts (except heating elements), and standard test probe shall not contact with heating elements.

Compliance is checked by the test of clause 8*.

4.1.2 Switch, handle, stand and the like shall not be live.

Compliance is checked by the test of clause 8*.

4.1.3 Switch (if any) shall be capable of breaking the current both phase conductor and neutral conductor.

Compliance is checked by inspection.

4.2 Creepage distance, clearances and distance through insulation Shall not be less than the values shown in Table 1.

Compliance is checked by the test of clause 29*.

4.3 Stability and mechanical safety

After the test of clause 20*, electric stove shall not overturn.

Table 1 Creepage distance, clearances and distance through insulation
(clause 4.2, 4.5.3 and 4.12)

| Parts | Distances |
|--|-----------|
| Creepage distance | |
| (1) Between live parts of different polarity | |
| - if protected against deposition of dirt | 3.0 |
| - if not protected against deposition of dirt | 4.5 |
| (2) Between live parts and other metal parts | |
| - over basic insulation | |
| if protected against deposition of dirt | |
| : if of ceramic material or pure mica and the like | 3.75 |
| : if of other material | 4.5 |
| if not protected against deposition of dirt | |
| : if of other material | 6.0 |
| - over reinforced insulation | 12.0 |
| (3) Between metal parts separated by supplementary insulation | 6.0 |
| (4) Between live parts in recesses in the mounting face of the electric stove and the surface to which it is fixed | 9.0 |
| Clearance | |
| (1) Between live parts of different polarity | |
| - if protected against deposition of dirt | 3.0 |
| - if not protected against deposition of dirt | 3.75 |
| (2) Between live parts and other metal parts | |
| - over basic insulation | |
| if protected against deposition of dirt | 3.75 |
| if not protected against deposition of dirt | 4.5 |
| - over reinforced insulation | 12.0 |
| (3) Between metal parts separated by supplementary insulation | 6.0 |
| (4) Between live parts in recesses in the mounting face of the electric stove and the surface to which it is fixed | 9.0 |
| Distance through insulation | |
| (1) Between metal parts separated by supplementary insulation | 1.5 |
| (2) Between metal parts separated by reinforced insulation | 3.0 |

Note This requirement does not apply, if the insulation is applied in thin sheet form and consist of at least three layers, provided that, when two layers are placed in contact, they withstand the electric strength test prescribed for reinforced insulation.

4.4 Supply connection and power supply cords

4.4.1 Electric stove shall be provided with a power supply cord complying with the Thai industrial standard for braided cords for electric heating appliances. (In the event that the mentioned standard has not been promulgated, IEC 245, code designation 245 IEC 51 S shall apply.)

Compliance is checked by inspection.

4.4.2 Power supply cords shall have a nominal cross-sectional area not less than 0.75 mm² for electric stove with rated current not exceeding 7 A, and not less than 1.0 mm² for electric stove with rated current not exceeding 10 A.

Compliance is checked by inspection.

4.4.3 Power supply cords of electric stove shall be provided with a plug. For electric stove with only basic insulation, the power supply cords shall also be provided with an earthing cord.

Compliance is checked by inspection.

4.5 Internal wiring

4.5.1 Wireways shall be smooth and free from sharp edges, which might damage insulation of cords. Holes through which wires pass shall have smooth well rounded surfaces or be provided with bushings.

4.5.2 Internal wiring and electrical connections between different parts of the electric stove shall be adequately protected or enclosed.

4.5.3 Internal wiring shall so fixed or so insulated that, in normal use, creepage distances and clearances cannot be reduced below the values specified in Table 1.

4.5.4 Insulated cable, having temperature rise at normal operation exceeding 50°C, shall be insulated by thermal resistant material.

Compliance is checked by the test of clause 23*.

4.6 Earthing

4.6.1 Accessible metal parts of electric stove, which may become live in the event of a basic insulation fault, shall be permanently and reliably connected to an earthing terminal within the electric stove.

Compliance is checked by the test of clause 27*.

4.6.2 Earthing terminals shall comply with the requirements. Screw terminals shall be used for the connection of earthing connector. The clamping means of earthing terminals shall be adequately locked against accidental loosening.

Compliance is checked by the test of clause 27*.

4.6.3 If detachable parts have an earth connection, this connection shall be made before the current-carrying connections are established when placing the part in position, and the current-carrying connections shall be separated before the earth connection is broken when removing the part.

Compliance is checked by the test of clause 27*.

4.6.4 All parts of earthing terminal shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the earthing conductor, or any other metal. The body of earthing terminal shall be of brass or other metal not less resistant to corrosion. Where the body of earthing terminal is a part of frame or enclosure of metal, the used screw or nut shall be of brass or other metal not less resistant to corrosion, or steel complying with the requirements of clause 4.13

Compliance is checked by the test of clause 27*.

4.6.5 The resistance between the metal part to be earthing and earthing terminal shall not exceeding 0.1 Ω.

Compliance is checked by the test of clause 27*.

4.6.6 Cord used for earthing shall be identified by the colour green or combination green yellow.

Compliance is checked by inspection.

4.7 Leakage current at

After test in accordance with clause 16*, the leakage current measured between live part and enclosure or accessible metal parts shall not exceed 0.75 mA.

4.8 Heating

The temperature rise of the various parts of electric stove shall not exceed the values given in table 2.

Compliance is check by the test of clause 11*.

Table 2 Temperature rise
(clause 4.8)

| Parts | Temperature rise, °C |
|--|----------------------|
| Switch, handle, stand and the like | |
| - of metal | 35 |
| - of porcelain or vitreous material | 45 |
| - of moulding, rubber or wood | 50 |
| Wall, floor and ceiling of test corner | 65 |

4.9 Electrical insulation and leakage current at operating temperature

4.9.1 After test in accordance with clause 13*, no flashover or breakdown shall occur.

4.9.2 After test in accordance with clause 13*, the leakage current measured between live part and enclosure or accessible metal parts shall not exceed 0.75 mA.

4.10 Moisture resistance

After the humidity treatment, electric stove shall have the electrical insulation and electric strength as specified values.

Compliance is check by the test of clause 15.4*.

4.11 Abnormal operation resistance

After the test in accordance of clause 19*, electric stove shall not be fire, parts of metal shall not be melt, enclosure shall not be deformed and temperature rise shall not exceed the values given in Table 3.

- Note 1. For electric stoves with more than one heating elements, the test shall be carried out only on the heating element giving maximum heating, or carried out the test on one heating element in case they are equal heating. And controller device shall be set to the position of maximum power input.
2. During testing, there shall not be any utensil on the electric stove.

Table 3 Temperature rise
(clause 4.11)

| Parts | Temperature rise, °C |
|---|----------------------|
| Wall, floor, and ceiling of test corner | 150 |
| Supply cord | 150 |

4.12 Mechanical strength

After the test of clause 21*, standard test finger shall not contact with live part. Creepage distance, clearance and distance through insulation cannot be reduced below the values specified in table 1.

Note Supporting plate shall not be tested.

4.13 Resistance to rusting

After the test of clause 31*, ferrous parts, the rusting of which might cause the safety decreasing, shall not be rust.

Note * refer to the clauses of the Thai industrial standard for safety of household and similar electrical appliances. (In the event that the standard has not been promulgated, IEC 335-1(1976) shall apply.)

5. Marking and labelling

5.1 Each electric stove shall bear at least number, letter or mark indicating legibly, clearly and permanently the following information

- (1) Rated input in watts;
- (2) Rated voltage in volts;
- (3) Warning “ Do not contact metal part during operation”
- (4) Name of manufacturer or factory or registered trade-mark or distributor;
- (5) Country of origin.

If foreign language is used, the meaning shall correspond to that in Thai.

5.2 Any person who manufactures product complying with this standard may use the Safety standard mark in connection with his product only after having received a license from the Industrial Product Standards Council.

6. Sampling and criteria for conformity

- 6.1 Lot means electric stoves of the same model and rated input, manufactured or delivery or purchasing at the same period of time.
- 6.2 Sampling and criteria for conformity shall comply with the following sampling plan or other technically equivalent sampling plan.

6.2.1 Sampling

Five samples shall be randomly taken from products of the same lot.

6.2.2 Criteria for conformity

Provided all samples shall satisfy all requirements of clause 3 and 4, the lot shall be deemed to comply with this standard.
