

TIS 1985-2549 (2006)
Thai Industrial Standard
for
Electrical appliances for skin or hair care:
Safety requirements

1. Scope

- 1.1 This standard specifies the safety requirements for electrical appliances for skin and/or hair care of persons and animals intended for household and similar purposes with the rated voltage not exceeding 250 V.

Note 101: Samples of electrical appliances classified under the scope of this standard include:

- Curling comb
- Curling iron
- Curling roller with separate heater
- Facial sauna
- Hairdryer
- Hand dryer
- Heater with detachable curler
- Permanent-wave appliance

Note 102: This standard covers appliances incorporating steam-producing or spray-producing devices.

Appliances not intended for normal household use but that nevertheless may be a source of danger to the public, such as appliances intended for commercial, industrial and farm uses, fall within the scope of this standard.

Note 103: Examples are appliances for use in hairdressing salons.

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 house. However, in general, it does not take into account:

- the use of appliances by young children or infirm persons without supervision
- young children playing with the appliances

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Note 104: 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.
- additional requirements as specified by the Ministry of Public Health, the Ministry of Labour and other agencies having related authority may be required.

Note 105: This standard does not apply to:

- appliances intended exclusively for industrial purposes
- 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)
- electric shavers, hair clippers and similar appliances (TIS 1555)
- appliances for skin exposure to UV and IR radiation (TIS 1877)
- sauna heating appliances (TIS 1804)
- appliances intended for medical purposes (IEC 60601)

2. (Blank)

No text

3. Definition

The meaning of terminology in this standard shall be in accordance with Clause 3 of TIS 1375, except as follows.

3.1.9 *Replace text:*

Normal operation

Operation of the appliance under the following conditions

Helmet-type hairdryers are operated with the axis of the hood inclined at an angle of 60 degrees to the horizontal or the maximum angle allowed by the construction if this is less. A dull black-painted wooden sphere, 200 mm in diameter, is placed in the hood so that its centre coincides with the axis of the hood, the shortest distance between the sphere and the air-outlet grille being 50 mm.

Hairdryers with a flexible hood attachment are operated with the hood attachment placed over the wire frame of Figure 101, and the frame being positioned over the wooden sphere.

Note 101: Helmet-type hairdryers that are supported by the head are operated as hairdryers with a flexible hood attachment.

Hand-held hairdryers are operated with unrestricted airflow directed downwards.

Permanent-wave appliances are operated in the normal position of use, with the curling rollers hanging freely.

Heaters for detachable curlers are operated in the normal position of use together with the curlers.

Curling irons, curling combs and similar appliances are operated with their major axis horizontal.

Appliances with steam-producing or spray-producing devices are operated with the container empty or filled, whichever is more unfavourable. However, if the appliance is marked to indicate that it is to be used with the container filled, the container is filled. Water is added, when necessary, to compensate for evaporation.

Hand dryers are operated in the normal position of use with unrestricted airflow.

Facial saunas are operated in the normal position of use and filled with water. Water is added, when necessary, to maintain the steam output.

3.101 **Helmet-type hairdryer**

Hairdryer with a rigid hood that is placed over the head in normal use

Note: The hood may be supported by a stand or have means for attachment to a support.

3.102 **Heater for detachable curlers**

Appliance for heating curling irons or curling rollers that accumulate heat

3.103 **Swivel connection**

Means for connecting the supply cord so that the appliance can be rotated continuously without twisting the cord

4. General requirement

This clause shall comply with Clause 4 of TIS 1375.

5. General conditions for tests

This clause shall comply with Clause 5 of TIS 1375, except as follows.

5.2 *Addition:*

Note 101: The additional test of Clause 25.14 for hand-held appliances is carried out on a separate appliance.

6. Classification

This clause shall comply with Clause 6 of TIS 1375, except as follows.

6.1 *Replacement:*

The appliance shall be in one of the following classes with respect to protection against electric shocks:

- hairdryers, curling irons, curling combs, facial saunas and other steam-producing or spray-producing appliances shall be Class II or Class III. However, fixed hairdryers intended to be permanently connected to fixed wiring, helmet-type hairdryers for hairdressers and steam-producing or spray-producing appliances for hairdressers may be Class I.
- other appliances shall be Class I, Class II, or Class III.

Compliance is checked by inspection and by the relevant tests.

6.2 *Addition:*

Hand dryers shall be at least IPX1.

The curling rollers of permanent-wave appliances shall be at least IPX4.

7. Marking, labelling and instructions

This Clause shall comply with Clause 7 of TIS 1375, except as follows.

7.1 *Addition:*

Portable hairdryers, curling irons and similar appliances shall be marked with symbol 5582 of IEC 60417 combined with the prohibition sign of ISO 3864-1, except for the specified colours of the prohibition sign, or with the substance of the following.

WARNING: Do not use this appliance near water.

Note 101 This mark may be on a label that is permanently attached to the appliance.

7.6 *Addition:*



[symbol 5582 of IEC 60417] Suitable for use in a bath or shower

7.12 *Addition:*

The instructions for portable hairdryers shall include the substance of the following.

- when the hairdryer is used in a bathroom, unplug it after use since the proximity of water presents a hazard even when the hairdryer is switched off.

- for additional protection, the installation of a residual current device (RCD) with a rated residual operating current not exceeding 30 mA is advisable in an electric circuit supplying the bathroom. Ask your installer for advice.

The instructions for facial saunas shall state that after use the appliance should be cleaned to avoid the accumulation of grease and other residues.

If symbol 5582 of IEC 60417 is used, together with the prohibition sign, the meaning shall be explained. Instructions shall also state the substance of the following.

WARNING: Do not use this appliance near bathtubs, showers, basins or other vessels containing water.

7.12.1 *Addition:*

The installation instructions for fixed hairdryers intended for use in bathrooms shall include the substance of the following:

This hairdryer must be fixed out of reach of a person taking a bath or shower.

If the hand-held part of the hairdryer incorporates electrical components, the instructions shall state that the appliance must be fixed so that the hand-held part, when fully extended, is out of reach of a person taking a bath or shower.

7.14 *Addition:*

The diameter of the circle superimposed on symbol 5582 of IEC 60417 shall not be less than 10 mm.

Compliance is checked by taking measurements.

8. Protection against access to live parts

This Clause shall comply with Clause 8 of TIS 1375, except as follows:

8.1.3 Not applicable.

9. Starting of motor-operated appliances

This clause of TIS 1375 is not applicable.

10. Power input and current

This Clause shall comply with Clause 10 of TIS 1375.

11. Heating

This Clause shall comply with Clause 11 of TIS 1375, except as follows:

11.1 *Addition:*

For appliances incorporating a swivel connection, compliance is also checked by the test under Clause 11.101.

11.2 *Addition:*

Appliances intended to be used on a stand or attached to a support are placed to give the most unfavourable results.

11.4 *Addition:*

If the temperature increase limits are exceeded in appliances incorporating motors, transformers or electronic circuits, and the power input is lower than the rated power input, the test is repeated with the appliance supplied at 1.06 times rated voltage.

11.6 *Replacement:*

Combined appliances are operated as heating appliances.

11.7 *Replacement:*

Appliances without a timer are operated

- for 30 minutes, for hand-held appliances
- in cycles of 30 s on and 5 s off until steady conditions are established, for hand dryers that are automatically controlled by the presence of the hands
- until steady conditions are established, for other appliances

Appliances incorporating a timer are operated in cycles until steady conditions are established. Each cycle consists of the maximum operating time of the timer followed by a rest period of 5 seconds.

11.8 *Addition:*

The temperature increase limits of motors, transformers and components of electronic circuits, including parts directly influenced by them, may be exceeded when the appliance is operated at 1.15 times rated power input.

The temperature increase of the handles of curling irons heated by a heater for detachable curlers incorporating a timer is determined at the end of the first cycle.

11.101 Appliances incorporating a swivel connection are positioned with their major axis horizontal, with the supply cord hanging vertically. A pull force of 1 N is applied to the supply cord.

The appliance is supplied at rated voltage, with the current being 1.25 times the rated current.

Note 1 This condition can be obtained by means of a resistor connected in place of the heating element.

The appliance is rotated about its major axis at a rate of approximately 50 rev/min, with the direction of rotation being reversed every 20 revolutions. The test is carried out for 1500 revolutions.

The temperature increase of the sliding contacts shall not exceed 65 K.

Note 2 The temperature increase may be determined by melting particles or colour changing indicators.

12. (Void)

No text

13. Leakage current and electric strength at operating temperature

This Clause shall comply with Clause 13 of TIS 1375.

14. Transient overvoltages

This Clause shall comply with Clause 14 of TIS 1375.

15. Moisture resistance

This Clause shall comply with Clause 15 of TIS 1375.

16. Leakage current and electric strength

This Clause shall comply with Clause 16 of TIS 1375.

17. Overload protection of transformers and associated circuits

This Clause shall comply with Clause 17 of TIS 1375.

18. Endurance

This clause of TIS 1375 is not applicable.

19. Abnormal operation

This Clause shall follow Clause 19 of TIS 1375, except as follows.

19.1 *Addition:*

Hairdryers are also subjected to the tests under Clauses 19.101 and 19.102.

19.2 *Addition:*

Restricted heat dissipation is obtained as follows:

- motors are disconnected
- hand-held hairdryers are placed on the floor of the test corner in any stable position likely to occur
- appliances intended to be filled with water are operated empty

Hairdryers with a flexible hood attachment are also tested with the motor operating, and the airflow through the hose is restricted to give the most unfavourable result.

Heaters for detachable curlers are placed on a piece of low-density glass-fibre insulation with a thermal insulation coefficient of approximately 2.5 m²K/W.

19.7 *Addition:*

The test is carried out for 5 minutes except for

- hand-held appliances
- appliances that have to be kept switched on by hand
- appliances incorporating a timer

Note 101 Hand dryers are subjected to the test only when the locked rotor torque is less than the full load torque.

19.9 Not applicable.

19.10 *Addition:*

The test is carried out with the heating elements disconnected or switched off.

19.101 Hairdryers are operated as specified in Clause 11 except that the motor is supplied separately at its working voltage.

Note: It may be necessary to compensate for the effect on the heating element of supplying the motor separately.

When steady conditions are established, the voltage applied to the motor is reduced until the running speed of the motor is just sufficient to prevent a thermal cut-out from operating, with the voltage applied to the heating elements being maintained at the value used for Clause 11.4.

The reduced voltage applied to the motor is determined as follows. The voltage is reduced by 5% and the motor is operated under this condition for 5 minutes. This procedure is repeated until the thermal cut-out operates. The voltage is then increased by 5%, this being the reduced voltage to be used for the test.

Under these conditions, the hairdryer is again operated until steady conditions are established.

The hairdryer shall not emit flames or molten metal, the temperature increase shall not exceed the values specified in Table 9, and the other criteria of 19.13 do not apply.

19.102 Portable hairdryers are operated under normal operation at 1.15 times rated power input.

A sheet of polyethylene approximately 200 mm x 200 mm in size, with a thickness of 50 µm, is placed against the air-inlet and moved in any direction in order to reduce the airflow so that the most unfavourable conditions are established.

The test is carried out for 30 minutes.

The test is repeated with the airflow directed horizontally.

Note: The most unfavourable conditions are usually obtained by positioning the polyethylene sheet so that the thermal cut-out is prevented from operating.

20. Stability and mechanical hazards

This Clause shall comply with Clause 20 of TIS 1375.

21. Mechanical strength

This Clause shall comply with Clause 21 of TIS 1375, except as follows.

21.1 Addition:

Hand-held appliances are also subjected to the test under Clause 21.101.

21.101 The appliance is placed on a horizontal surface positioned 700 mm above the rigidly supported hardwood board and operated while supplied at rated voltage.

The appliance is lifted from the surface by its supply cord and allowed to drop freely. The test is carried out 5 times, with the appliance being placed on the horizontal surface in different positions likely to occur.

The appliance shall not be damaged to such an extent that compliance with this standard is impaired. In particular, the requirements of Clauses 8 and 29 shall be fulfilled.

22. Construction

This Clause shall comply with Clause 22 of TIS 1375, except as follows.

22.24 *Addition:*

The heating element shall also be unlikely to come into contact with the skin or hair if it ruptures.

22.32 *Addition:*

Supplementary insulation and reinforced insulation in Class II curling irons shall be resistant to aging.

Compliance is checked by the following test.

Samples of insulation not mentioned in Table 3 are suspended in a heating cabinet so that there are at least 10 mm *between* the samples, and between the samples and the top and bottom of the cabinet. The samples shall be at least 50 mm from the walls of the cabinet. The volume of the samples is not to exceed one tenth of the capacity of the cabinet.

The cabinet is ventilated by natural convection, with at least 3 air changes per hour. The temperature of the cabinet is maintained at $30\text{ K} \pm 1\text{ K}$ in excess of the temperature increase of the part determined during the tests of Clause 19 or at 70 ± 2 degrees Celsius, whichever is higher.

The samples are kept in the cabinet for 240 hours and then at ambient temperature for at least 16 hours.

The samples shall show no cracks and shall withstand the electrical strength test under Clause 16.3 for supplementary insulation.

Note 101 Insulation mentioned in Table 3 is considered to be resistant to aging.

22.36 *Addition:*

For Class I appliances, other than hand dryers and face dryers, metal parts that could be in contact with skin or hair in normal use shall be separated from live parts by double insulation or reinforced insulation and shall not be earthed.

22.40 *Addition:*

When the switch is in the off position it shall disconnect electrical circuits, unless compliance with Clause 19 does not depend on the operation of the self-resetting thermal cut-out.

22.101 Appliances with steam-producing or spray-producing devices shall be constructed so that there is no spillage or unintentional outburst of steam or water that is likely to cause a hazard.

Compliance is checked during the test of Clause 11.

22.102 The curling rollers of permanent-wave appliances with integral heating elements shall be supplied with safety extra-low voltage not exceeding 24 V.

Compliance is checked by inspection and by the relevant tests.

23. Internal wiring

This Clause shall comply with Clause 23 of TIS 1375, except as follows.

23.3 Addition:

The number of flexings carried out for conductors that are only flexed when the appliance is stored is 5000.

24. Components

This Clause shall comply with Clause 24 of TIS 1375, except as follows.

24.1.3 Addition:

Switches incorporated in hand dryers are subjected to 50,000 cycles of operation.

24.2 Modification:

Helmet-type hairdryers and permanent-wave appliances may incorporate a switch in a flexible cord.

25. Supply connection and external flexible cords

This Clause shall comply with Clause 25 of TIS 1375, except as follows.

25.5 Addition:

Type Z attachment is allowed for

- hand-held appliances
- hairdryers with a flexible hood attachment
- heaters for detachable curlers having not more than 10 curlers

25.7 Modification:

Light polyvinyl chloride sheathed cords are allowed regardless of the mass of the appliance. The temperature increase limit of 130 K is allowed as long as the temperature increase decreases to 75 K within 5 minutes of the appliance being switched off.

25.14 Addition:

The force applied to the supply cord of appliances provided with a swivel connection is

- 20 N, for cords with a nominal cross-sectional area exceeding 0.75 mm^2
- 10 N, for other cords

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Hand-held appliances are additionally tested while mounted on an apparatus similar to that of Figure 8 with the supply cord hanging vertically and loaded with a force of 10 N. The oscillating part of the apparatus is moved through an angle of 180 degrees and back to the original position. The number of flexings is 4000, with the rate of flexing being 6 per minute.

Note 101: The appliance is mounted so that the direction of flexing corresponds to that most likely to occur when the supply cord is wound around the appliance for storage.

Note 102: This test is not carried out on appliances incorporating a swivel connection.

25.15 *Addition:*

The swivel connection is not locked during the tests.

25.101 Swivel connections shall be adequate for normal use of the appliance.

Compliance is checked by the following test.

The appliance is operated under the conditions specified in Clause 11.101, with the number of revolutions being increased to 20,000.

After this test, the swivel connection and the supply cord shall be fit for further use. Live parts shall not have become accessible and the appliance shall withstand the electric strength test of Clause 16.3.

26. Terminals for external conductors

This Clause shall comply with Clause 26 of TIS 1375, except as follows.

26.10 *Addition:*

Terminals with screw clamping and screwless terminals shall not be used for Type X attachments in appliances incorporating a swivel connection.

27. Provision for earthing

This Clause shall comply with Clause 27 of TIS 1375.

28. Screws and connections

This Clause shall comply with Clause 28 of TIS 1375.

29. Clearance, creepage distances and solid insulation

This Clause shall comply with Clause 29 of TIS 1375, except as follows.

29.3 *Addition:*

For curling irons, the distance through insulation between metal parts separated by supplementary insulation may be reduced to 0.6 mm provided that the distance through basic insulation is at least 1 mm.

30. Resistance to heat and fire

This Clause shall comply with Clause 30 of TIS 1375, except as follows.

30.1 *Addition:*

For hand dryers and hairdryers, the temperature increases occurring during the test of Clause 19 are not taken into account.

30.2 *Addition:*

For heaters for detachable curlers, Clause 30.2.3 is applicable. For other appliances, Clause 30.2.2 is applicable.

30.101 Helmet-type hairdryers shall be resistant to fire.

Compliance is checked by inspection and by applying the needle-flame text of Annex E to:

- parts of non-metallic material enclosing the heating element and other electrical components
- non-metallic parts within the enclosure

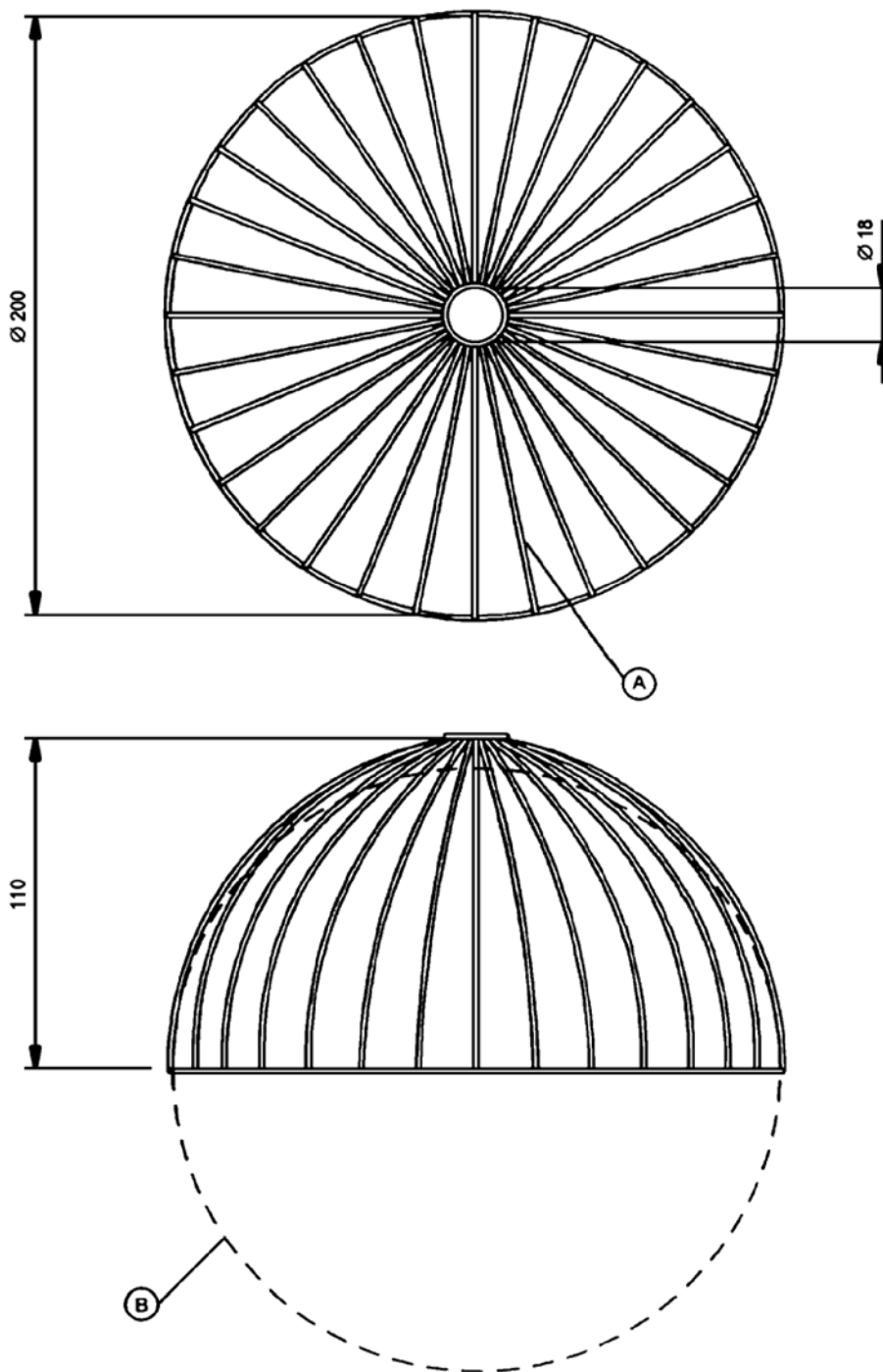
The needle-flame test is not carried out on material classified as V-0 or V-1 according to IEC 60695-11-10, provided that the test sample was no thicker than the relevant part.

31. Resistance to rusting

This Clause shall comply with Clause 31 of TIS 1375.

32. Radiation, toxicity, and similar hazards

This Clause shall comply with Clause 32 of TIS 1375.



Dimensions in millimetres

- A Frame consisting of 32 equally spaced wires of 1.5 ± 0.5 mm diameter
- B Location of the wooden sphere

Figure 101 - Wire Frame
(Clause 3.1.9)

Annex

The annexes of TIS 1375 are applicable.
