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Methods for measuring performance for household and similar electric heating pads

家用和类似用途电热垫性能测试方法

(IEC 61255:2014, Household electric heating pads – Methods for measuring performance, MOD)

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Methods for measuring performance for household and similar electric heating pads

1 Scope

This document specifies the main performance characteristics and test methods of electric heating pads for household and similar purposes.

This document applies to electric heating pads for household and similar purposes.

This document does not specify performance characteristic values.

Note: This document does not involve the safety requirements covered by GB 4706.8.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB 4706.8-2008 Household and similar electrical appliances - Safety - Particular requirements for blankets, pads and similar flexible heating appliances [IEC 60335-2-17:2006(Ed 2.1), IDT]

GB/T 10807 Flexible cellular polymeric materials - Determination of hardness (indentation technique) (GB/T 10807-2006, ISO 2439:1997, IDT)

GB/T 35758-2017 Household electrical appliances -- Measurement of standby power (IEC 62301:2011, IDT)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Heating pad

Appliances for local heating to the human body; it has a flexible part with a heated area not exceeding 0.3 m^2 on each side.

Electric heating pads are classified according to the types of power source:

- Electric heating pads that are connected to the electric network source directly;

- Extra-low voltage electric heating pads.

Note: The rated voltage of the extra-low voltage heating pad does not exceed 24V.

4.4 Application methods

Electric heating pads are classified according to their application methods:

- Dry-using heating pads;

- Wet-using heating pads, including cosmetic heating pads.

4.5 Washing methods

Electric heating pads are classified according to the washing methods:

- Hand wash;

- Machine wash;

- Not washable.

4.6 Duration of use

Electric heating pads are classified according to the duration of use:

- Electric heating pads with timing function;

- Electric heating pads that can be used continuously.

5 Test items

The performance of the heating pad is determined by the following test items.

- Dimensions, mass, and the textile’s composition (see Chapter 7);

- Temperature uniformity (see Chapter 8);

- Heating time and energy consumption (see Chapter 9);

- Cyclic changes (see Chapter 10);

- Washing effect (see Chapter 11).

6 General conditions of the test

Unless otherwise specified, the test shall be carried out under the following conditions:

a) Laboratory

The test shall be carried out in a room with no forced convection air and an ambient temperature of (20±5) °C.

b) Supply voltage

The supply voltage shall be within ±1% of the rated voltage. If the rated voltage range of the heating pad is calibrated, the test report shall indicate the voltage used in the test.

Note: If the test result at the rated voltage of the heating pad is possible to be mistaken for the result at the voltage of the supply system, then appliances may also be tested at the voltage corresponding to the rated voltage of the system.

c) Placement of heating pads

Any removable covers shall be installed; the flexible part shall be placed between thermal insulation materials which shall exceed the edge of the heated area by at least 100 mm.

Thermal insulation materials shall be made of open-cell polyether:

- Hole count: 18^{+2}_{0} /cm;
- Specified mass: $30\ \mathrm{kg/m^3}\left(^{+10}_{0}\ \%\right)$;
- Hardness: 120 N~170 N when the indentation measured according to GB/T 10807 reaches 40%.

Fully support the thermal insulation materials with a piece of 20 mm thick plywood, at least 300 mm from the ground.

The thickness of the thermal insulation materials under the electric heating pad is about 72 mm, and the thickness of the thermal insulation materials covering the electric heating pad is about 36 mm. Thermal insulation materials shall meet the requirements of Appendix AA of GB 4706.8-2008.

trace and can cover the maximum number of heating elements. The number of test points shall meet the requirement that the center-to-center distance between adjacent test points is not more than 200 mm. Measure the temperature at 3 locations on the use surface at least.

Place the electric heating pad controller in the position with the maximum temperature and energize it; measure the temperature when a steady state is established or at the end of a complete working cycle.

Measure the temperature at each point, calculate the average value, and then subtract the room temperature to obtain the temperature rise value. The range of temperature rise is determined by the difference between the maximum temperature rise and the minimum temperature rise.

Note: If there is more than one heated area, calculate each heated area separately.

The consistency is calculated by dividing the number of test points of the heated area on which the average temperature rise is within ±2 K by the total number of test points; the result is expressed as a percentage.

Temperature uniformity is expressed in terms of temperature rise range and consistency. The temperature rise range is expressed in K and accurate to 1 K. Consistency is expressed as a percentage and accurate to 1%.

9 Heating time and energy consumption

9.1 Heating time

Under the following test conditions, test the heating pad to obtain the heating time required for the temperature rise reaching 20 K.

Before testing, keep the electric heating pad at an ambient temperature of (20 ± 2) °C for at least 24 hours.

Use a thermocouple to measure the temperature rise; connect the thermocouple to the center of a copper sheet measuring 65 mm x 65 mm x 0.5 mm, and place the copper sheet in the center of the heated area.

Place the electric heating pad controller in the highest temperature position and energize it; record the required time for the temperature rise reaching 20 K.

The heating time is expressed in minutes and accurate to 1 min.

The heating pad shall be able to record the heating time and accurate to 1 min.

9.2 Energy consumption

Determine the energy consumption of both the heating time and the working cycle.

Place the electric heating pad controller in the highest temperature position and energize it; then, measure the energy consumption.

The energy consumption of the heating time is expressed in W • h and accurate to one decimal place.

For the electric heating pad with timing function, the test is continued until the heating pad stops working according to the pre-set time.

Electric heating pads with timing function shall record the total energy consumption for a complete working cycle. Energy consumption is expressed in W • h and accurate to one decimal place.

For electric heating pads that can be used continuously, measure the energy consumption of the first 90 min, and the energy consumption between the second and third hours.

Electric heating pads that can be used continuously shall record the energy consumption of the first 90 minutes. Energy consumption is expressed in W • h and accurate to one decimal place.

Electric heating pads that can be used continuously shall record the energy consumption between the second and third hours. Energy consumption is expressed in W • h / h and accurate to one decimal place.

If they are applicable, measure the input power of the appliance in standby mode according to Chapter 5 of GB/T 35758-2017, and record the appliance's standby power in accordance with Chapter 6 of GB/T 35758-2017.

10 Cyclic changes

As described in Chapter 8, the maximum temperature rise in one working cycle of the test point that is closest to the center of the heating pad is the cyclic change. The cyclic change is expressed as K and accurate to 1 K.

11 Washing effect

Determine the washing effect of washable electric heating pads in terms of size.

Wash the heating pad or its removable cover three times in accordance with the manufacturer's manual; then, measure their sizes in accordance with the

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