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Electric radiant heating film for low temperature

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Foreword

This standard was proposed by the Ministry of Housing and Urban-Rural Development Standard Rating Research Institute.

This standard shall be under the jurisdiction of Ministry of Housing and Urban-Rural Development Construction Component Technical Committee for Standardization.

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Electric Radiant Heating Film for Low Temperature

1 Scope

This standard specifies the terms and definitions, classification and marking, requirements, test methods, inspection rules, marking, packaging, operation instruction, transport and storage of electric radiant heating film for low temperature.

This standard applies to electric radiant heating film for low temperature (hereinafter referred to as electrothermal film) used for construction and heat supply. Rated voltage of single-phase device does not exceed 250V; rated voltage of other industries does not exceed 480 V. Electrothermal film for electrothermal heating in other industries may also refer to this standard.

2 Normative references

The articles contained in the following documents have become part of this standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this standard. For the undated documents so quoted, the latest editions shall be applicable to this standard.

GB/T 191 Packaging - Pictorial marking for handling of goods (ISO 780: 1997, MOD)

GB/T 2829-2002 Sampling procedures and tables for periodic inspection by attributes (Apply to inspection of process stability)

GB 4208-2008 Degrees of protection provided by enclosure (IP code) (IEC 60529:2001, IDT)

GB 4706.1-2005 Household and similar electrical appliances – Safety - Part 1: General requirements (IEC 60335-1:2004 (Ed4.1), IDT)

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, IDT)

GB 4706.82-2007 Safety of household and similar electrical appliances - Particular requirements for flexible sheet heating elements for room heating (IEC 60335-2-96: 2002 IDT)

GB/T 7287-2008 Test method of infrared heater

GB 8808 Test method for peel force of flexible laminated plastics

3 Terms and definitions

For the purpose of this standard, the following terms and definitions shall apply.

3.1

Electrothermal film

A kind of film that can generate heat after power-on. It is a planar heat generating component that is composed of electrically insulating material and heat generating resistor material encapsulated therein.

3.2

Electric radiant heating film

The electrothermal film that transfers electrical energy into thermal energy and passes thermal energy out mainly in the form of radiation.

3.3

Flexible electrothermal film

The electrothermal film of which the electric insulating material is in flexible sheet.

3.4

Rigid electrothermal film

The electrothermal film of which the electrical insulating material is in rigid sheet (or plate).

3.5

power density

The power of unit-area on effective heating surface of electrothermal film.

3.6

Normal operation

The state of operating according to normal use conditions, when electrothermal film is connected with the power.

3.7

After the test in 6.20, rigid electrothermal film shall not be broken and shall be able to withstand electric strength inspection.

5.20 Electric-to-radiant power transfer efficiency

Electric-to-radiant power transfer efficiency of electrothermal film shall not be less than 55%.

5.21 Working life

Accumulated working time of electrothermal film under normal working state shall not be less than 30 000 h.

6 Test methods

6. 1 General conditions for test

6.1.1 The test shall be carried out under the following conditions.

a) Temperature controllers sensitive to temperature are not taken into consideration;

b) For electrothermal film that requires on-site cutting, the test shall be carried out after connection to supply lead and its edges protection;

c) Ambient temperature is 20°C ±5°C;

d) Relative air humidity is not greater than 85%;

e) There is no significant air convection in the laboratory;

f) Length of electrothermal film length is better to be between 500mm and 1 000mm; the width is according to manufacturer's instructions; test-sample preparation in 6.14 and 6.18 is in accordance with provisions of the test method.

6. 1.2 It is necessary to take 6 samples for test:

a) Tests in 6.9.6.10 and 6.11 are carried out on one sample.

b) Tests in 6.13 and 6.14 are carried out on one sample.

c) Tests in 6.15.6.16 and 6.17 are carried out on one sample.

d) Test in 6.18 is carried out on one sample.

e) Tests in 6.21 and 6.22 are carried out on one sample.

f) Other tests are carried out on the sixth sample.

Conduct in according with the method specified in 30.102 of GB 4706. 8-2003.

6. 19 Impact test

Place electrothermal film on a level concrete floor and conduct the following test:

a) Make a Philips screwdriver of 140g fall freely from a height of 2m; falling direction shall be ensured that the top of screwdriver can hit the surface of electrothermal film.

b) Make a iron ball of 500g fall freely from a height of 2 m to hit the surface of electrothermal film; the test is conducted on two surfaces respectively.

After the tests in a) and b), observe the changes of electrothermal film and again conduct electric strength test.

In electric strength test, aluminum foil of covering electrothermal film shall be able to cover the impacted area.

6.20 Drop test

Put electrothermal film in a low temperature test chamber at a temperature of -15°C±2°C; keep for 4 h and take out; lift it to a height of 2 m away from the cement ground and make free vertical drop. After the test, observe the changes on surface; make it recover for 1 h at room temperature and then conduct electric strength test.

6.21 Electric-to-radiant power transfer efficiency

Conduct in accordance with the method specified in chapter 17 of GB/T 7287-2008.

6.22 Operation life test

Conduct in accordance with the method specified in chapter 22 of GB/T 7287-2008.

Accelerated aging test is carried out in accordance with the actual installation conditions specified in product operation instructions.

Test time is 360 h.

After the test is completed, if the outer surface of sample meets the requirements of 5.2, the leakage current is not greater than 3.5 mA, electric strength is not lower than the standard value, deviation of actual power does not exceed ±10%, electric-to radiant power transfer efficiency is not lower than 90% of initial value, then it is determined that the service life of this sample is not less than 30 000 h.

7 Inspection rules

7.1 Inspection classification

8.3.1 During transport process, prevent severe vibration and extrusion; adopt rain and snow preventive and sun blocking measures, and prevent the erosion of chemicals.

8.3.2 Handle with care; stack neatly; throwing is strictly prohibited.

8.4 Storage

8.4.1 Finished products shall be stored in dry and ventilated warehouses where there is no corrosive gases around, and relative humidity is not greater than 85%. Heavy load and open storage are strictly forbidden.

8.4.2 Electrothermal film shall be classified and stored based on model; stacking depth shall not be greater than the stacking height indicated on packing case.

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