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Infrared devices for instant screening of human skin temperature

红外人体表面温度快速筛检仪

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Infrared devices for instant screening of human skin temperature

1 Scope

This Standard specifies the classification, requirements, test methods, inspection rules, marks and user manual for infrared devices for instant screening of human skin temperature.

This Standard is applicable to design stereotype, production and inspection of infrared devices for instant screening of human skin temperature (hereinafter referred to as the screening device).

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 191-2008, *Packaging - Pictorial Marking for Handling of Goods* (ISO 780:1997, MOD)

GB/T 2423.5-1995, *Environmental testing for electric and electronic products Part 2: Test methods Test Ea and guidance: Shock* (idt IEC 60068-2-27:1987)

GB/T 2423.10-2008, *Environmental testing for electric and electronic products - Part 2: Tests methods - Test Fc: Vibration (sinusoidal)* (IEC 60068-2-6:1995, IDT)

GB 9706.1-2007, *Medical electrical equipment - Part 1: General requirements for safety* (IEC 60601-1:1988, IDT)

GB/T 9969, *General Principles for Preparation of Instructions for Use of Industrial Products*

GB/T 16886.1-2001, *Biological evaluation of medical devices - Part 1: Evaluation and testing* (idt ISO 10993-1:1997)

GB/T 18268-2000, *Electrical equipment for measurement, control and*

conditions, the difference between the temperature measured by the screening device in the calibration mode and the blackbody temperature.

3.7 alarm temperature value

The pre-set critical temperature value of the screening device. When the display temperature measured by the screening device reaches or exceeds this temperature value, the screening device issues an alarm.

3.8 alarm response time

The time when the temperature of the measured object reaches or exceeds the alarm temperature value, the screening device from the excitation to the alarm.

3.9 measurement uniformity

Consistency of temperature measurement results in different areas of the thermal imaging screener's field of view.

4 Product classification

The types of the screening device are generally divided into:

a) Point temperature type screening device:

Point temperature screening device refers to an instrument that measures and screens the skin temperature of the human body through a single infrared detector.

According to its use form, the point temperature screening device can be divided into: portable screening device and fixed screening device.

b) Multi-point screening device:

Multi-point screening device refers to an instrument that simultaneously measures and screens the skin temperature of human body through multiple infrared detectors.

According to the arrangement of infrared detectors, the multi-point screening device is divided into: in-line screening device and matrix screening device.

c) Thermal image screening device:

Thermal image screening device refers to an instrument that measures and screens the temperature in the field of view through an infrared camera.

5.2.4 Functions that thermal image screening device shall also have

The thermal image screening device shall also have the following functions:

a) Focusing function: the screening device can adjust the image to the clearest object in the temperature measurement;

b) Single-point or multi-point temperature display function in the thermal image;

c) Indication and tracking function of the hottest area in the thermal image;

d) When the screening device issues an alarm, it can automatically store the thermal image function (optional);

e) Temperature field shielding function, that is, the function of not measuring temperature in some areas of the thermal image (optional);

f) Thermal image's freeze function (optional).

5.3 Performances

5.3.1 Temperature display range

In any display mode, the temperature display range of the screening device shall not be narrower than 28.0°C~42.0°C.

5.3.2 Laboratory error

Under the specified working environment, when the blackbody temperature is 33°C~37°C, the laboratory error of the screening device shall not be greater than 0.4°C.

Under the specified working environment, when the blackbody temperature is lower than 33°C or higher than 37°C, the laboratory error of the screening device is not greater than 0.6°C.

5.3.3 Alarm response time

The alarm response time of the screening device shall not be greater than 2s.

5.3.4 Measurement uniformity

The measurement uniformity of the thermal image screening device shall not exceed ±0.2°C.

5.4 Climate environment adaptability

5.4.1 Normal working environment conditions

5.7.1 Immunity

It shall meet the criterion of "continuous monitoring operation" in Table 2 of Clause 6 of GB/T 18268-2000.

5.7.2 Emission limit

It shall meet the requirements of Table 3 in Clause 7 of GB/T 18268-2000.

6 Test methods

6.1 Laboratory conditions

At laboratory temperature of (23±3)°C, relative humidity of (55±15)% RH, the laboratory lighting shall make the measurement results and image quality (thermographic) of the screening device not significantly affected and laboratory air meets clean requirements.

6.2 Requirements for experimental equipment

6.2.1 The equipment used in the test shall be verified or calibrated by a qualified calibration laboratory.

6.2.2 The blackbody shall meet the following requirements:

Temperature range: covering all temperature ranges required by the test requirements of this Standard, and continuously adjustable;

Effective emissivity: ≥0.997;

Uncertainty of temperature: no more than 0.13°C;

Temperature stability: 0.05°C/10min;

The effective target surface of the blackbody shall be able to meet the test requirements of the screening device to be tested.

6.3 Basic requirements

6.3.1 All materials in contact with the operator or the measured object on the body of the screening device shall be evaluated according to GB/T 16886.1-2001. Confirm whether it meets the requirements of 5.1.1.

6.3.2 Visually inspect and feel the screening device to confirm whether it meets the requirements of 5.1.2.

6.4 Functions

6.6 Climate environment adaptability

6.6.1 Normal working environment conditions

Test methods and determination for normal working environmental conditions have been included in 6.5.2.

6.6.2 Environmental conditions for storage and transportation

6.6.2.1 The screening device is in the packaging state or the simple packaging state. Place in the environmental test chamber with a temperature of -20°C and a relative humidity of less than 50% for 7d. Place in the environmental test chamber with a temperature of 50°C and a relative humidity of not less than 75% without condensation for 7d. After the end of each placement period, recover for sufficient time.

6.6.2.2 The screening device is stable for more than 30 min under the laboratory conditions of 6.1. According to the method recommended by the manufacturer, measure the reading of the blackbody temperature that is set at 35°C (not exceeding ±0.5°C). Measure 5 times in total. Calculate the error of each measurement according to formula (1). Take the largest δ_j value as the laboratory error. Confirm whether the result meets the requirements of 5.3.2.

The screening device shall be tested under calibration mode. If the calibration mode cannot be provided, the temperature reading in body temperature mode shall be converted to the temperature value in calibration mode according to the correction method recommended by the manufacturer.

6.7 Mechanical environment adaptability

6.7.1 Impact

In accordance with Table 1 and “Test Ea” of GB/T 2423.5-1995.

After the test, measure according to 6.6.2.2. Confirm whether it meets the requirements of 5.3.2.

6.7.2 Vibration

In accordance with Table 1 and “Test Fc” of GB/T 2423.10-1995.

After the test, measure according to 6.6.2.2. Confirm whether it meets the requirements of 5.3.2.

6.7.3 Fall (applicable to portable screening device)

Under the laboratory conditions of 6.1, drop the screening device from a height of 1m to a 50mm thick hard board that is placed flat on a solid base (cement

It shall have the following marks:

a) product name, model and exit-factory number;

b) name of manufacturer or distributor;

c) date of inspection;

d) inspector code.

8.1.3 The marks on the packing box of the screening device shall comply with the provisions of GB/T 191-2008.

8.2 User manual

Each screening device shall provide user manual. The preparation of the user manual shall comply with the provisions of GB/T 9969.

The specifications in the user manual shall include but not limited to the following:

a) temperature display range;

b) maximum laboratory error;

c) suitable parts for measuring the skin temperature of human body;

d) recommended method of operation;

e) duration of recalibration or inspection (if applicable);

f) ambient temperature and relative humidity range for operation and storage.

There shall be detailed instructions for use in the user manual, alarm messages that may affect the performance of the screening device if any of the following conditions occur:

a) operate outside the specified temperature range;

b) operate outside the specified operating temperature and humidity range;

c) store and transportation outside the specified ambient temperature and humidity range;

d) optical components are stained or damaged;

e) mechanical shock or impact occurs.

In order to enable purchasers to identify products that meet the requirements of this Standard, the manufacturer and distributor shall give the following

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