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Textiles - Testing and evaluation for far infrared radiation properties

纺织品 远红外性能的检测和评价

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Textiles - Testing and evaluation for far infrared radiation properties

1 Scope

This standard specifies the method for measuring the far-infrared radiation property of textiles by the far-infrared emissivity and temperature rise test; gives the evaluation of the far-infrared radiation property.

This standard applies to all types of textile products, including fibers, yarns, fabrics, non-woven fabrics and their products. Other materials can refer to it.

This standard does not involve the evaluation of medical effects.

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/T 6529 Textiles - Standard atmospheres for conditioning and testing

GB/T 8629-2001 Textiles - Domestic washing and drying procedures for textile testing

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Far infrared emissivity

The ratio of the normal far-infrared radiation intensity between the specimen and the standard blackbody plate at the same temperature under specified conditions.

4 Principle

4.1 Determination of far-infrared emissivity

Place the standard blackbody plate and the specimen on the hot plate one after

5.3 An open cylindrical metal container which has a diameter of 60 mm and a height of 30 mm.

5.4 For the yarn specimen frame, the effective test size shall not be less than the size of test hot plate.

6 Test environment and preparation

6.1 Specimen humidity conditioning and environmental requirements

The humidity shall be conditioned in accordance with the standard atmospheric temperature and humidity environment and procedures as specified in GB/T 6529; there shall be no other heat radiation sources affecting it.

6.2 Pretreatment

6.2.1 If necessary, wash the samples in accordance with the 7A procedure in GB/T 8629-2001; the number of washes shall be agreed by the parties concerned.

Note: The number of washing times should be no less than 30 for inner wear, 10 times for outer wear; not less than 5 times for bedding. In the case of multiple washings, the time can be accumulated for continuous washing, or washing according to the method and number of times approved by the relevant party. The number of washings and methods are described in the report.

6.2.2 Condition the humidity of the sample in the environment as specified in 6.1 to make it reach balance; do not contaminate the sample.

6.3 Preparation of specimen

6.3.1 Fiber

When measuring the far-infrared emissivity, open the fiber specimen into a fluffy state; take 0.5 g of fiber and fill it into an open cylindrical metal container which has a diameter of 60 mm and a height of 30 mm. The fiber is completely filled in the container; take at least 3 specimens from each set of sample. When determining the temperature rise, comb the fibers into a fluffy state; evenly spread it to a uniform cylindrical flocculus which has a thickness of about 30 mm and a diameter of more than 60 mm. Take at least 3 specimens from each set of samples.

6.3.2 Yarn

Lay the yarn specimen in a single layer tightly and fix it on a square metal specimen frame which has a side length of not less than 60 mm. When measuring the far-infrared emissivity, place the specimen frame flat and

completely cover the hot plate. When measuring the temperature rise, fix the specimen frame vertically on the specimen holder of the temperature rise device, with the center of the specimen frame directly facing the center of the specimen holder's opening. Take at least 3 specimens for each of the emissivity and temperature rise tests.

6.3.3 Sheet samples such as fabrics

Cut at least 3 specimens for emissivity and temperature rise from each sample. The size of the specimen is not less than 60 mm in diameter. The specimen shall be flat and representative when sampling. If there are areas in the sample that may have large differences in far-infrared performance due to large differences in structure, color, etc. (including splicing components in the product), unless otherwise specified, each area shall be sampled separately.

7 Test procedure

7.1 Determination of far-infrared emissivity

7.1.1 Heat the test hot plate to 34 °C

7.1.2 Place the standard blackbody plate on the test hot plate; record the far-infrared radiation intensity of the standard blackbody I_0 after the test value is stable.

7.1.3 Place the humidity-conditioned specimen on the test hot plate; record the far-infrared radiation intensity of the specimen after the test value is stable (e.g., 15 min).

Note: If some instruments can directly calculate far-infrared emissivity, record the far-infrared emissivity value of each specimen.

7.1.4 Test the remaining specimens according to the steps in 7.1.3.

7.2 Test of far-infrared radiation temperature rise

7.2.1 Adjust the distance between the specimen holder and the radiation source, so that the distance between the specimen surface and the radiation source is 500 mm.

7.2.2 Clamp the test surface of the humidity-conditioned specimen in the specimen holder facing the infrared radiation source. Fix the contact of the thermometer sensor at the center of the surface of the irradiated area of the specimen.

7.2.3 Record the initial temperature of the sample surface T_0.

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