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Home textiles - Determination of the light blocking effect of fabric - Illuminometer method

家用纺织品 织物遮光性的测定 照度计法

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1 Scope

This document describes the test method for determination of the light blocking effect to fabric using an illuminometer.

This document applies to home textile fabrics and their products.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 6529 Textiles - Standard atmospheres for conditioning and testing

3 Terms and definitions

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

3.1

light blocking effect

The ability of textiles to prevent the transmission of light.

NOTE: It is expressed as blocking rate.

3.2

illuminance

The quotient of the luminous flux incident on the surface element containing the point divided by the area of the surface element.

NOTE: The unit is lux (lx).

[Source: GB 50034-2013, 2.0.6, modified]

4 Principle

Irradiate stable light with a certain intensity on the surface of the sample, measure the illuminance after the light passes through the sample, compare it with the illuminance without the sample, and characterize the light blocking effect of the fabric by calculating the light blocking rate of the sample.

5 Test method

5.1 Test apparatus

5.1.1 The light blocking effect test apparatus shall include: a test chamber for placing the sample, with a round hole in the center of the top; a light source simulating sunlight is placed directly above the test chamber and vertically corresponding to the round hole of the test chamber; an illuminometer is placed at the bottom of the test chamber to measure changes in illuminance. Figure 1 shows a schematic diagram of a light blocking effect test apparatus. Other apparatuses with the same effect can also be used.

5.1.2 Test chamber: The size is approximately 40 cm × 40 cm × 10 cm. The diameter of the round hole at the top that exposes the sample to the light source shall be 10 cm. The internal surface of the test chamber shall be covered with black coating material to avoid light reflection inside the chamber that will affect the test results.

5.1.3 Light source: Halogen lamp, the illuminance can reach up to 199000 lx, installed on a height-adjustable shelf.

5.1.4 Illuminometer: It shall be located at the center position below the round hole of the test chamber. The test range is 0.01 lx ~ 199000 lx. The measurement accuracy of the illuminometer is ±2 %.

5.4 Test procedures

5.4.1 Turn on the power switch of the test apparatus and the power indicator light will light up.

5.4.2 Calibrate the illuminometer.

5.4.3 Set the illuminance of the light source. Set the illuminance of the light source of the apparatus to 100000 lx, and read the illuminance value (i_0) in this state.

5.4.4 Measure the illuminance value of the sample. Place the sample on the upper part of the apparatus, with the test surface facing the light source, the surface of the sample is flat and wrinkle-free, and read the illuminance value (i_1) passing through the sample.

5.5 Result calculation

5.5.1 Calculate the blocking rate (%) according to formula (1). The test result is the average of three samples, rounded to single digits.

$$T = \left(1 - \frac{i_1}{i_0}\right) \times 100 \qquad \cdots\cdots (1)$$

where:

T - the blocking rate, %;

i_1 - the illuminance value after installing the sample, in lux (lx);

i_0 - the illuminance value when the sample is not installed, in lux (lx).

5.5.2 For homogeneous samples, use the average of three samples as the test result; for samples with different colors or fabric structures, report the average of the test results for each color or structure.

6 Test report

The test report shall include the following content:

a) Indicate that the test is conducted in accordance with this document;

b) Description of the sample;

c) Test temperature and relative humidity;

d) If necessary, indicate the test surface of the sample;

e) Test results;

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