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Textile Trim Materials in the Interior of Automobiles - Test Method for Schopper Abrasion

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Table of Contents

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1 Scope

This document describes the test method of adopting the mode of Schopper rotational abrasion for the determination of the abrasion resistance of textile trim materials used in the interior of automobiles.

This document is applicable to the testing of the abrasion resistance of textile trim materials mainly made of textile fiber raw materials and used for the seats and door panel decorations of automobiles.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in this text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 250 Textiles - Tests for Color Fastness - Grey Scale for Assessing Change in Color

GB/T 3820 Determination of Thickness of Textiles and Textile Products

GB/T 6259 Standard Atmospheres for Textiles Conditioning and Testing

GB/T 21196.1-2007 Textiles - Determination of the Abrasion Resistance of Fabrics by the Martindale Method - Part 1: Martindale Abrasion Testing Apparatus

FZ/T 01047 Standard Light Sources and Conditions for Visual Assessment of Textile Color Fastness

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 fuzzing

Fuzzing refers to the phenomenon that the fabric is subject to external friction during use, causing the fibers on the surface of the fabric to protrude or the fiber ends to protrude to form fuzz.

3.2 pilling

Pilling refers to the phenomenon that the fluff on the surface of the fabric cannot fall off in time during use and becomes entangled with each other to form pills.

3.3 whiten

Whiten refers to the phenomenon that the surface color of a fabric turns white after wear and tear.

4 Principle

Under specified atmospheric environmental conditions, apply a specified load to the specimen; after adopting the mode of Schopper rotational abrasion to rub the specimen against the abrasive for a specified number of turns, the specimen may show phenomena of fuzzing, pilling and whiten, etc. Thus, determine the mass loss, abrasion surface appearance and discoloration grade of the specimen.

5 Instruments and Materials

5.1 Schopper Abrasion Tester

The Schopper abrasion tester consists of a pressurizing device and a specimen fixture. Th abrasive can be firmly fixed on the lower end of the pressurizing device and rub against the specimen fixed on the upper end of the specimen fixture under a certain pressure; the schematic diagram is shown in Figure 1. The specimen fixture consists of a chunk, a clamping device and a specimen locking ring; the schematic diagrams are shown in Figure 1 and Figure 2. The chuck is a cylinder with a tapered surface at one end, with a diameter of 85 mm ± 1 mm and a cone angle of 166°; the distance (L) between the chuck vertex and the normal rotation axis is 3 mm, and the angle between the chuck axis and the normal rotation axis is 7°. The rotation speed of the specimen fixture is 75 r/min ± 1 r/min, and the rotation direction can be changed clockwise or counterclockwise.

1---chuck;

2---specimen locking ring;

3---clamping device.

Figure 2 -- Schematic Diagram of Clamping Device

5.2 Measuring Gauge

It can measure the height difference (specimen arch height) between the specimen vertex and the specimen clamping surface after the specimen is installed on the chuck, with an accuracy of 1 mm.

5.3 Electronic Balance

The accuracy is 0.1 mg.

5.4 Abrasive

Silicon carbide waterproof sandpaper, model P400, with a size of at least 20 cm × 9.5 cm, and completely covering the entire friction surface. Alternatively, abrasives agreed upon by both sides may also be used.

5.5 Polyurethane Foam Lining

Comply with the requirements of 6.3 in GB/T 21196.1-2007. If the test requires the use of a polyurethane foam lining, then, use a new polyurethane foam lining each time.

5.6 Rating Box

Use white fluorescent tubes for illumination to ensure uniform illumination over the entire width of the specimen, and it shall be ensured that the observer does not look directly into the light. The position of the light source and the plane of the specimen shall be maintained at 5° ~ 15°, and the observation direction and the plane of the specimen shall be maintained at 90° ± 10° (see Figure 3). The distance between eyes with normal corrected vision and the specimen shall be 30 cm ~ 50 cm.

9 Result Assessment

9.1 Mass Loss

Calculate the mass difference of the specimen before and after the test, and take the average value of three sets of data as the test result, accurate to 0.001 g.

9.2 Abrasion Surface Appearance

Use a magnifying device to check the appearance of the abrasion surface of the specimen surface to see whether there are phenomena like yarn breakage, pilling, fuzzing and whiten, and record the condition of the abrasion surface.

9.3 Discoloration Grade

The rating box shall be placed in a darkroom. Along the longitudinal direction of the fabric, place tested specimens and an untested specimen side by side in the middle of the specimen board of the rating box. Place the tested specimens on the left and the untested specimen on the right. Use a grey scale of discoloration that complies with the stipulations of GB/T 250 to rate and record the abrasion surface of each specimen surface. In order to prevent direct light exposure, at the edge of the rating box, observe each specimen directly from the front of the specimens.

At least two persons shall rate the specimens. The rating result of a single person is the average value of the ratings of all specimens; the test result of the sample is the average value of the rating results of all persons. If the average value is not an integer, round it off to the nearest level 0.5 and use "–" to express it, for example, 3–4. If the difference between a single test result and the average value exceeds half a level, then, the rating of each specimen shall be reported at the same time.

10 Test Report

The test report shall include the following content:

a) Serial No. of this document;

b) Description of the sample;

c) Friction load used in the test;

d) Description of the abrasive used;

e) Humidity conditioning conditions of the sample;

f) Number of abrasion times of the sample;

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