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**Adhesives for polyvinyl chloride floor coverings**

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# Adhesives for polyvinyl chloride floor coverings

## 1 Scope

This Standard specifies the classification and labeling, requirements, test methods, inspection rules, as well as packaging, marking and storage of adhesives for polyvinyl chloride floor coverings (hereinafter referred to as adhesives).

This Standard applies to adhesives for sticking polyvinyl chloride floor coverings in buildings.

## 2 Normative references

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

GB/T 1410-2006, Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials

GB/T 11982.2-2015, Polyvinyl chloride floor coverings - Part 2: Homogeneous polyvinyl chloride floor covering

GB 18583, Indoor decorating and refurbishing materials - Limit of harmful substances of adhesives

GB/T 29592-2013, Determination of the emission of volatile organic compounds and aldehydes of adhesives for building products

JC/T 412.1-2006, Fiber cement flat sheets - Part 1: Non-Asbestos Fiber cement flat sheets

## 3 Classification and labeling

### 3.1 Classification

Adhesives are classified – by their usage characteristics – into:

- Ordinary adhesives, codenamed P;
- Anti-static adhesives, codenamed F.

## **5 Test methods**

### **5.1 State adjustment and standard test conditions**

Before testing, the test samples and test equipment shall be placed under standard test conditions of temperature  $(23\pm 2)$  °C and relative humidity  $(50\pm 5)\%$  for at least 24 hours and the test shall be carried out under these conditions.

### **5.2 Test materials**

#### **5.2.1 Non-asbestos fiber cement flat sheets**

Non-asbestos fiber cement flat sheets – with a thickness of 8 mm – in accordance with the requirements for grade NAF H V in JC/T 412.1-2006 shall be used. The surface of the cement flat sheets shall be free of dust, particles and stains. Before testing, it shall be kept in an oven at  $(80\pm 2)$  °C for 6 hours, and then placed under the standard test conditions specified in 5.1 for 48 hours before use.

#### **5.2.2 Plastic floor coverings**

Homogeneous coiled floor coverings – of grade 33 or above and a total thickness not less than 2 mm – in accordance with GB/T 11982.2-2015 shall be used. When sampling, the distance from the edge of the floor covering shall be at least 50 mm. The long side of the coiled floor covering shall be the longitudinal direction of the floor covering. The surface of the coiled floor covering shall be clean and dust-free, and the back shall be smooth. After sampling, place it under the standard test conditions specified in 5.1 for at least 48 hours before use.

### **5.3 Test equipment**

#### **5.3.1 Coating equipment**

##### **5.3.1.1 Coating comb knife for ordinary adhesives**

Schematic diagram of the coating comb knife and dimensions for ordinary adhesives (see Figure 1).

Note:

X – peeling length, in millimeters (mm);

Y – peeling load, in Newton (N);

a – value point.

### **Figure 8 – Schematic diagram of 90° peeling strength test curve**

#### **5.6.3 90° peeling strength after heat treatment**

Place the test piece prepared according to 5.6.1 under the standard test conditions specified in 5.1 for 7 days; then place the test piece in a constant temperature forced air drying oven at  $(50 \pm 2)$  °C for 20 days; take it out and place it under the standard conditions specified in 5.1 for 1 day. Then measure the 90° peeling strength according to 5.6.2.2.

#### **5.6.4 Calculation results**

Calculate the 90° peeling strength of a single test piece according to Formula (1).

Where:

$\sigma$  – 90° peeling strength, in Newton per millimeter (N/mm);

F – 90° average peeling load, in Newton (N);

D – average width of the test piece, in millimeters (mm).

The 90° peeling strength of a single test piece is accurate to 0.01 N/mm. Express the test results as the arithmetic mean of five test pieces, accurate to 0.1 N/mm.

#### **5.7 Shear strength**

##### **5.7.1 Test piece preparation**

Prepare five 60 mm × 50 mm bottom sheets, using the longitudinal direction of the non-asbestos fiber cement flat sheet that meets the requirements of 5.2.1 as the long side. Place the bottom sheet horizontally with the front side facing upwards; use a 40 mm × 50 mm adhesive tape to stick it to one end of the bottom sheet. Prepare the test sample according to the product manual. Use a coating comb knife that meets the requirements of 5.3.1 to apply the glue once along the long side of the non-asbestos fiber cement flat sheet at about 60°. Apply the sample evenly on the non-asbestos fiber cement flat sheet. The effective coating size is 20 mm × 50 mm. Carefully tear off the adhesive tape. When applying the glue, keep the coating comb knife clean and free of residual glue.

### **5.8.3.2 Gluing**

Prepare the test sample according to the requirements of the product manual. Use a coating comb knife that meets the requirements of 5.3.1 to apply glue on the front of the asbestos-free fiber cement flat sheet with a size of 250 mm × 250 mm that meets the requirements of 5.2.1. The angle between the coating comb knife and the asbestos-free fiber cement flat sheet is about 60°. The coating direction shall be parallel to one side of the sheet.

### **5.8.3.3 Bonding**

Bond the back of the plastic floor covering that has passed the requirements of 5.8.3.1 to the glued surface of the non-asbestos fiber cement flat sheet that has been glued in 5.8.3.2 for the time specified by the product manufacturer. The longitudinal direction of the plastic floor covering test piece shall be perpendicular to the texture of the adhesive. Gently flatten it with hands; then, use the roller specified in 5.3.2 to roll it from front to back once under its own weight to ensure that the surface of the test sample is rolled. Repeat the rolling once perpendicular to the first rolling direction; wipe off the remaining glue; perform maintenance. If the plastic floor covering still bends after rolling, a pressure block with a mass of  $(5.0 \pm 0.25)$  kg shall be placed on the test piece for  $(3 \pm 0.5)$  h. The pressure block load shall be evenly distributed on the entire adhesive layer of the test piece.

## **5.8.4 Test procedure**

### **5.8.4.1 Accelerated aging test process**

Maintain the test pieces prepared according to the requirements of 5.8.3 under the standard test conditions specified in 5.1 for 7 days; then place the test pieces in a constant temperature blast drying oven at  $(50 \pm 2)$  °C for 13 days. All test pieces shall be placed horizontally, and the distance between the test pieces and the inner wall of the constant temperature blast drying oven shall not be less than 100 mm, so as to ensure good air circulation. Take out and place under the standard test conditions specified in 5.1 for 24 hours; then place the test pieces in a constant temperature blast drying oven at  $(50 \pm 2)$  °C for 13 days; take out and place under the standard test conditions specified in 5.1 for 24 hours; use the elongation measuring instrument specified in 5.8.1 to measure the distance  $L$  of each pair of marked points in the longitudinal and transverse directions of each plastic floor covering, with an accuracy of 0.01 mm; observe whether the test pieces have abnormal phenomena such as bulging and degumming.

### **5.8.5 Result calculation**

Calculate the dimensional change rate of a single test piece after accelerated aging according to Formula (3).

Express the results as the arithmetic mean of three test pieces.

#### **5.10 Limit of harmful substances**

Follow the provisions of GB 18583.

#### **5.11 Emission of harmful substances**

By GB/T 29592-2013, respectively measure the formaldehyde emission concentration and total volatile organic compound (TVOC) emission concentration at 3 days and 7 days. The coating amount is  $(250 \pm 10)$  g/m<sup>2</sup>. Prepare two test pieces for each test. After coating, immediately place the test pieces in a climate chamber for testing. Express the results as the arithmetic mean of the two test pieces.

### **6 Inspection rules**

#### **6.1 Inspection classification**

##### **6.1.1 Ex-factory inspection**

Ex-factory inspection items include appearance quality and coating properties.

##### **6.1.2 Type inspection**

Type inspection items include all the required items in Chapter 4 except the emission of harmful substances. In any of the following cases, type inspection shall be carried out:

- a) Trial type identification of new products or old products transferred to the factory;
- b) After formal production, if there are major changes in the raw materials, processes, production equipment, etc. of the product, which may affect the product performance;
- c) During normal production, it shall be conducted once a year;
- d) When the factory inspection result is significantly different from the previous type inspection;
- e) When the production, which is stopped for more than half a year, is resumed.

#### **6.2 Batching and sampling**

##### **6.2.1 Batching**

The same type of products produced with the same raw materials, the same formula and process of 8 tons are considered a batch, and any amount less than 8 tons is also considered a batch.

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