JC

BUILDING MATERIAL INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 91.100.50

Q 24

Registration number: 14592-2004

JC 936-2004

One-component polyurethane foam

单组分聚氨酯泡沫填缝剂

Issued on: October 20, 2004 **Implemented on: April 01, 2005**

Issued by: National Development and Reform Commission of PRC

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One-component polyurethane foam

1 Scope

This standard specifies the classification, raw materials, technical requirements, preparation of specimens and test pieces, test methods, inspection rules, marking, packaging, transportation and storage of single-component polyurethane foam sealants.

This standard applies to aerosol-filled one-component polyurethane foam sealant which uses the polyol and polyisocyanate as main raw materials (hereinafter referred to as PU sealant).

2 Normative references

The provisions in following documents become the provisions of this standard through reference in this standard. For the dated references, the subsequent amendments (excluding corrections) 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 6343 Cellular plastics and rubbers - Determination of apparent (bulk) density (GB/T 6343-1995, neq ISO 845:1988)

GB 8624-1997 Classification on burning behavior for building materials

GB/T 8626 Test method of flammability for building materials

GB/T 8811 Test method for dimensional stability of rigid cellular plastics (GB/T 8811-1988, idt ISO 2796:1980)

GB/T 10294 Thermal insulation - Determination of steady-state thermal resistance and related properties - Guard hot board apparatus (GB/T 10294-1988, eqv ISO/DIS 8302)

GB 13042 Packing containers - Aerosol cans

GB/T 13520 Unplasticized polyvinyl chloride extruded boards

State Environmental Protection Administration (former), etc. HK [1997] No.366 Notice on the prohibition of the use of chlorofluorocarbons in the aerosol industry

3 Classification

3.1 PU sealants are classified into grades B2 and B3 according to the combustion performance grade, as shown in clauses 5.2 and 5.3 of GB 8624-1997.

3.2 PU sealants are divided into gun type (Q) and tube type (G) according to the packaging structure.

3.3 Product's marking

The product is marked in the following order: name, combustion performance grade, packaging structure, standard number.

Example: A grade B2 gun-type one-component polyurethane foam sealant is marked as: one-component polyurethane foam sealant B2 Q JC 936-2004.

4 Raw materials

The raw materials of PU sealant shall comply with the provisions of the HK [1997] No.366 from the Environmental Protection Administration (former). It is prohibited to use CFCs[1].

5 Technical requirements

5.1 Appearance

The PU sealant is a liquid in the aerosol can, the ejected material is a foam of uniform color, without undispersed particles and impurities. It is a rigid foam-plastic having uniform cells after curing.

5.2 Physical properties

The physical properties of PU sealant shall be in accordance with the provisions of Table 1.

[1] Note: CFCs: It refers to foaming agent monofluoromethylene chloride (F-11), difluoromethylene chloride (F-12) trifluorotrichloroethane (F-113) which may be used in PU sealant.

7 Test methods

7.1 Appearance

Perform visual inspection at the time of preparation of the test piece.

7.2 Density

It is performed according to the provisions of GB/T 6343.

7.3 Dimensional stability

It is performed according to the provisions of GB/T 8811. The test conditions are (23 ± 2) °C. Perform test 72 h after preparing test piece.

7.4 Thermal conductivity

It is performed according to the provisions of GB/T 10294. The average temperature at the test point is 35 °C.

7.5 Flammability

It is performed according to the provisions of GB/T 8626. Use edge ignition.

7.6 Tensile bond strength

It may select one or more substrates in 6.3.3.1.

7.6.1 Test equipment

7.6.1.1 Tensile testing machine: The accuracy is not more than 2 N, the load ranges (0 ~ 1000) N, it is equipped with a dedicated tensile fixture, the tensile speed can be adjusted to 5 mm/min.

7.6.1.2 Vernier caliper: The accuracy is 0.02 mm.

7.6.1.3 Constant-temperature bath: The volume can accommodate the test piece, the controllable temperature is (23 ± 1) °C.

7.6.2 Test procedures

7.6.2.1 Tensile bond strength under standard conditions

Remove the pad from the test piece which has been prepared and cured according to 6.3.3.4. Use the vernier caliper to measure the size of the bonded part. Load it into the tensile machine, stretch the fixture until it is damaged. Record the damage load (N) and the state of destruction.

Where:

τ - Shear strength, in kilocalories (kPa);

F - Damage load, in Newtons (N);

L - Length of the bonded part of the test piece, in millimeters (mm);

b - Width of the bonded part of the test piece, in millimeters (mm).

The test results take the arithmetic mean of the five test pieces, accurate to the integer position.

7.8 Foaming multiple

According to the provisions of 6.2.2, inject in layers the sample materials from an aerosol can into the formwork which has an inner size of 400 mm x 400 mm x 600 mm. Empty the aerosol can. After 72 h, use a balance which has an accuracy of 0.1 g to weigh the mass (M) of the foam block. Then, respectively from the upper, middle, lower parts of the foam block, take 5 specimens in total. Follow the provisions of 7.2 to determine the density of the foam specimen (ρ). Use its average value to calculate the volume of the foam block (V_f). Use the formula (3) to calculate the foaming multiple, accurate to the integer position.

$$f = V_f / V_0 = \frac{M}{\rho V_0} \qquad \cdots\cdots (3)$$

Where:

f - Foaming multiple;

V_f - The volume of the foam block, in liters (L);

M - The mass of the foam block, in grams (g);

ρ - The density of the foam block, in kilograms per cubic meter (kg/m^3);

V_0 - The indicated capacity of aerosol can, in liters (L).

8 Inspection rules

8.1 Classification of inspections

8.1.1 Exit-factory inspection

The manufacturer shall, according to the provisions of this standard, perform exit-factory inspection for each batch of products. The exit-factory inspection

When the appearance quality does not meet the requirements of 5.1, the batch of products is judged to be unqualified.

In the inspection results, if two or more items fail, the batch of products is judged to be unqualified. If one item fails, it is allowed to double the specimen from the same batch of products for single item re-inspection. If it still fails, the batch of products is judged as unqualified.

9 Marking, packaging, transportation, storage

9.1 Marking

The outer packaging of each product shall be marked with the following:

a) Name of product;

b) Label of product;

c) Net capacity and foaming multiple;

d) Date of manufacture, shelf life;

e) Trademark;

f) Name and address of the factory;

g) Hazardous substances and signs of flammable products;

h) Method of use;

i) Safety precautions.

9.2 Packaging

9.2.1 Packaging materials

The product is packed in pressure-resistant metal can. Its technical performance shall meet the requirements of GB 13042, wherein the deformation pressure is not less than 1.5 MPa, the burst pressure is not less than 1.8 MPa.

9.2.2 Packing specifications

Specifications can be: 250 ml/piece, 500 ml/piece, 600 ml/piece, 750 ml/piece. It can also be determined according to the user's needs.

9.3 Transportation

Appendix A

(Informative)

Method for detecting chlorofluorocarbons (CFCs) in one-component polyurethane foam sealant

A.1 Scope of application

The method is suitable for the detection of chlorofluorocarbons (CFCs) in aerosol canned one-component polyurethane foam sealant.

A.2 Principles of test

Based on the high-efficiency separation ability of the gas chromatography for the mixture as well as the accurate identification capability of the mass spectrometer for the purified material, use the gas chromatographic-mass spectrometer to qualitatively analyze the components of gas which is extracted from the aerosol can.

A.3 Test equipment

A.3.1 Gas chromatography-mass spectrometer

Gas chromatographic conditions: Quartz capillary column, carrier gas is high-purity nitrogen, column temperature is 40 °C, perform test under constant-temperature. The temperature at the sample inlet is 100 °C, the pre-column pressure is 110 kPa.

Mass spectrometry conditions: EI ion source, electron energy 70 ev, ion source temperature 150 °C, electron multiplier voltage 1.2 kV, detection mode is full scanning.

A.3.2 Airbag

Rubbery, covered with aluminum foil thermal insulation layer, for sampling of gas specimens.

A.3.3 Syringe

2 ml, which is used for extracting gas from the airbag.

A.4 Sampling of gas

Place the aerosol can which is filled with the specimen upright. Place it in a constant-temperature test chamber at 25 °C for 24 h. Carefully install the gun

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