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Volatile organic compounds in furniture components - Test method for the rapid determination in the field

家具部件中挥发性有机化合物

现场快速检测方法

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Volatile organic compounds in furniture components - Test method for the rapid determination in the field

1 Scope

This document specifies the terms and definitions, principle, reagents or materials, equipment, test procedure, and test data processing of the test method for the rapid determination in the field for volatile organic compounds in furniture components.

This document is applicable to the rapid determination in the field of volatile organic compounds in furniture components, whose maximum side length does not exceed 800 mm and height does not exceed 300 mm.

2 Normative references

The contents of the following documents, through normative references in this text, constitute indispensable provisions of this document. Among them, for dated references, only the edition corresponding to that date applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 18204.2-2014 Examination methods for public places - Part 2: Chemical pollutants

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Volatile organic compounds in furniture components

Organic compounds which are released from furniture components and can be detected in the outlet gas of the test equipment.

3.2

Loading factor

The ratio OF the surface area of the furniture component TO the amount of

pressure is formed at the inflation interface. The vacuum pump can have its own flowmeter or connected to an external flowmeter, which can quantify the volume of gas filled. The flow accuracy error of the mini vacuum pump is within ±5%.

6.4 Area measuring instrument

Steel ruler or tape measure. The measurement accuracy shall not be less than 1 mm. If an area determination instrument is used, the accuracy shall not be less than 100 mm^2.

7 Test procedure

7.1 Preparation before test

Use the area measuring instrument (6.4) to measure the surface area of the furniture component sample. According to the dimensions of the furniture component, select the appropriate gas bag (6.2). Use a tie rod sealing strip to seal the gas bag; fill the gas bag with the high-purity nitrogen (5.1) of 2/3 of the total volume of the gas bag. Connect the rapid VOCs analyzer (6.1) to the gas outlet of the gas bag; open the gas outlet valve; detect the VOCs concentration of the air in the gas bag. The background concentration of target volatile organic compounds in the gas bag shall not be higher than 0.005 mg/m^3.

7.2 Air replacement and load retention in gas bag

Put the furniture component in the center of the gas bag (6.2); place one end on the support element (5.2), to ensure that the furniture component does not fit the gas bag as much as possible. Use a tie rod sealing strip to seal the gas bag; connect the mini vacuum pump (6.3); vacuum the gas bag. After 5 min, observe whether the gas bag leaks.

Fill the gas bag with about 1/2 volume of high-purity nitrogen (5.1); then evacuate the gas bag; and, repeat this operation 3 times. Finally, fill with high-purity nitrogen of 1/2 to 2/3 of the volume of the gas bag. According to formula (1), calculate the loading factor of the sample. Make the loading factor of the sample controlled at 5 m^2/m^3~10 m^2/m^3. Record the volume of nitrogen filled.

Close the gas valve; keep the gas bag sealed. Place the gas bag at room temperature for 60 min; record the on-site temperature and atmospheric pressure.

7.3 Collection and analysis

7.3.1 Sampling

Before sampling, the gas in the gas bag (6.2) shall be evenly mixed. Connect the gas bag outlet to the rapid VOCs analyzer (6.1). The sampling pipeline shall be firmly connected. The connecting pipe shall be as short as possible. It shall use polytetrafluoroethylene or silica gel material.

7.3.2 Rapid formaldehyde analysis

After the load retention is over, within 30 s, open the outlet of the gas bag (6.2). Collect the gas in the gas bag into the rapid formaldehyde analyzer (6.1.1). The reading displayed on the rapid formaldehyde analyzer is the formaldehyde concentration value. The measured value of the volume fraction shall, in accordance with formula (15) in GB/T 18204.2-2014, 7.4.4.1, be converted into mass concentration.

7.3.3 Rapid analysis for other aldoketone VOCs

After the load retention is over, within 30 s, open the outlet of the gas bag (6.2). At a rate of 100 mL/min, collect the gas in the gas bag into the rapid analyzer for aldoketone VOCs (6.1.2). The sampling time is 10 min. The reading displayed on the rapid analyzer for other aldoketone VOCs is aldoketone concentration value.

7.3.4 Rapid analysis for non-aldoketone VOCs

After the load retention is over, within 30 s, open the outlet of the gas bag (6.2). At a rate of 100 mL/min, collect the gas in the gas bag into the rapid analyzer for non-aldoketone VOCs (6.1.3). The sampling time is 10 min. The reading displayed on the rapid analyzer for non-aldoketone VOCs is the concentration value of non-aldoketone VOCs.

8 Test data processing

8.1 Loading factor of sample

The loading factor of the sample is calculated according to formula (1):

$$L_v = d / V \qquad \cdots\cdots (1)$$

Where:

L_v - Loading factor of sample, in square meters per cubic meter (m^2/m^3);

d - The surface area of furniture component, in square meters (m^2);

V - The volume of nitrogen filled into the gas bag, in cubic meters (m^3).

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