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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 46856-2025

**Determination of the emission of certain volatile organic
compounds from juvenile products**

婴童用品挥发性有机物释放量的测定

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Table of Contents

Foreword...	3
1 Scope...	4
2 Normative references...	4
3 Terms and definitions...	4
4 Principle...	5
5 Reagents and materials...	5
6 Instruments and equipment...	6
7 Sampling steps...	7
8 Instrumental analysis...	11
9 Specimen data processing...	13
10 Method detection limit...	13
11 Precision...	14

1 Scope

GB/T 46856-2025 is the Chinese national standard covering what a cot, a pushchair or a play mat gives off into the air around a baby - the chamber test, the compounds measured and the emission rates, on products used by the people least able to tolerate them. First edition, in force from 1 June 2026, with GB/T 46975-2025 on carry cots. It was issued on 31 December 2025 and has been in force since 1 June 2026, as a first edition. The document is under the responsibility of the China National Light Industry Council. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes the testing methods for the release of volatile organic compounds (VOCs) in juvenile products. This document applies to the determination of volatile organic compounds such as naphthalene, methyl acrylate, methyl methacrylate, 2-phenyl-2-propanol, formamide, benzene, toluene, ethylbenzene, m-xylene, p-xylene, and o-xylene in finished juvenile products, materials, and components.

2 Normative references

This document has no normative references.

3 Terms and definitions

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

3.1 area of exposure The total area of all exposed surfaces of the sample that are in direct contact with ambient air during use. NOTE. This includes the contact surfaces of the main structure, accessories, and detachable parts, but excludes internal areas that are not in contact with ambient air.

3.2 area load factor The ratio of the area of exposure of the sample to the volume of the sampling bag (climate chamber). NOTE. The unit is square meters per cubic meter (m^2/m^3).

3.3 air exchange rate The ratio of the amount of clean air entering the climate chamber per unit time to the volume of the climate chamber. [Source: GB/T 31107-2014, 3.5]

4 Principle

Place the sample in a sampling bag or climate chamber. Simulate sample usage environment conditions to test. After a specified time, use a sampling tube to collect the released volatile organic compounds. Use thermal desorption-gas chromatography-mass spectrometry (TD-GC-MS) to determine the volatile organic compounds. Use the external standard method to perform quantification. NOTE. This document provides methods for detecting volatile organic compound (VOC) release using the sampling bag method and the climate chamber method. The results obtained from these two methods are not necessarily correlated. Users shall choose the appropriate method based on their specific application scenario.

5 Reagents and materials

Unless otherwise specified, all reagents used are analytically pure.

5.1 Naphthalene (CAS No. 91-20-3). purity $\geq 98\%$.

5.2 Methyl acrylate (CAS No. 96-33-3). purity $\geq 98\%$.

5.3 Methyl methacrylate (CAS No. 80-62-6). purity $\geq 98\%$. **5.4 2-Phenylon-2-propanol** (CAS No. 617-94-7). purity $\geq 98\%$.

5.5 Formamide (CAS No. 75-12-7). purity $\geq 98\%$.

5.6 Benzene (CAS No. 71-43-2). purity $\geq 98\%$.

5.7 Toluene (CAS No. 108-88-3). purity $\geq 98\%$.

5.8 Ethylbenzene (CAS No. 100-41-4). purity $\geq 98\%$.

5.9 m-Xylene (CAS No. 108-38-3). purity $\geq 98\%$.

5.10 p-Xylene (CAS No. 106-42-3). purity $\geq 98\%$.

5.11 o-Xylene (CAS No. 95-47-6). purity $\geq 98\%$.

5.12 Methanol. chromatographically pure or higher. 5.13 11 volatile organic compound mixed standard stock solution (1000 $\mu\text{g/mL}$). accurately transfer an appropriate number of standard products (5.1~5.11) into a 10 mL volumetric flask. Dilute to volume with methanol (5.12). Prepare a standard stock solution with a concentration of 1000 $\mu\text{g/mL}$. NOTE. The standard stock solution shall be stored sealed in a refrigerator at $0^{\circ}\text{C}\sim 4^{\circ}\text{C}$. The shelf life is 3 months.

5.14 Mixed working solution. transfer an appropriate volume of the standard stock solution (5.13). Prepare a series of standard solutions with methanol to prepare mixed working solutions with concentrations of 10 $\mu\text{g/mL}$ and 100 $\mu\text{g/mL}$.

5.15 Helium. purity $\geq 99.999\%$.

6 Instruments and equipment

6.1 Gas chromatography-mass spectrometry (GC-MS).

6.2 Thermal desorption unit. capable of performing two-stage thermal desorption on the adsorption sampling tube and carrying the desorbed gas into the gas chromatograph using a carrier gas. Desorption temperature, desorption time, and flow rate are adjustable. The cold trap enables rapid heating. All gas tubing within the instrument, including the connection between the thermal desorption unit and the gas chromatograph, shall be made of silanized stainless steel.

6.3 Sampling tube. tenax tube, filled with at least 200 mg of adsorbent. Both ends of the sampling tube are sealed with metal nuts and PTFE rings.

6.4 Sampling device and components. the tubing shall be made of polytetrafluoroethylene (PTFE), with an outer diameter of $\phi 8$ mm or less (inner diameter of $\phi 4$ mm) and a length of 50 cm or less. If the diameters of the tubing and collection tube, or the tubing and sampling bag are inconsistent, flexible tubing can be used to connect them. Ensure that all pipes and joints do not absorb or release gas, and that there are no gas leaks at the connections. Before use, the sampler shall be heated in clean air at 100°C for approximately 24 h. The sampler shall be able to accurately control the sampling volume within a flow rate range of 50 mL/min~1200 mL/min when the sampling tube is installed. The sampling flow rate shall be calibrated periodically using a flow meter. The error shall be less than 5%.

6.5 Constant temperature drying oven. temperature control range is $20^{\circ}\text{C}\sim 100^{\circ}\text{C}$; allowable deviation. $\pm 2^{\circ}\text{C}$.

6.6 Temperature and humidity chamber. temperature control range is $20^{\circ}\text{C}\sim 80^{\circ}\text{C}$; allowable

deviation. $\pm 2^{\circ}\text{C}$. Relative humidity adjustment range is 30%–80%; allowable deviation. $\pm 5\%$.

6.7 Sampling bags. low adsorption and low gas permeability; do not release interfering substances; generally made of fluoropolymer film; equipped with a PTFE valve that can be opened and closed, and a removable sealing strip. The blank value of the sampling bag shall be lower than the method detection limit of the target analyte in this document. Sampling bags are available in different sizes, such as 5 L, 10 L, 50 L, 100 L, 1000 L, etc.

6.8 Climate Chamber. the interior walls and piping of the climate chamber shall be manufactured using materials with low release, low permeability, low adsorption, and VOC inertness. All joints in the climate chamber (except for the doors) shall be sealed. The air exchange rate n is

$0.2\text{ h}^{-1}\sim$

2.0 h^{-1} ; the relative error shall not exceed $\pm 3\%$. Allowable temperature deviation. $\pm 2^{\circ}\text{C}$; allowable relative humidity deviation. $\pm 5\%$. The blank value of the climate chamber shall be lower than the method detection limit of the target substance in this document. Climate chambers are available in different specifications, such as 60 L, 1 m^3 , 5 m^3 , etc.

6.9 Flow meter. soap film flow meter or electronic flow meter, used for gas flow calibration of sampler, with an indication error $\leq \pm 1\%$.

6.10 Microsyringe. $5\text{ }\mu\text{L}$ or $10\text{ }\mu\text{L}$.

6.11 Steel ruler or measuring tape. accuracy is not less than 1 mm.