

ICS 87.040



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

GB/T 23986-2009

**Paints and varnishes -- Determination of volatile organic
compound (VOC) content -- Gas-chromatographic method**

色漆和清漆 挥发性有机化合物(VOC)含量的测定 气相色谱法

(English Translation)

Issued on: June 2, 2009

Implemented on: January 1, 1970

Issued by: General Administration of Quality Supervision, Inspection and

Table of Contents

Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Principle	6
5 Required supplementary information	6
6 Apparatus	6
7 Reagents	9
8 Sampling	10
9 Procedure	10
10 Calculation	13
11 Expression of results	14
12 Precision	14
13 Test report	15
Annex A (Normative) Required supplementary information	17
Annex B (Informative) Examples of gas-chromatographic conditions	18
Bibliography	21

Foreword

This Standard is identical with the international standard ISO 11890-2:2006 "Paints and Varnishes - Determination of Volatile Organic Compound (VOC) - Part 2: Gas chromatographic" (English Version).

This Standard is equivalent to translate ISO 11890-2:2006.

For ease of use, the editorial modified contents of this Standard are as follows.

- Use "this Standard" to replace "this international standard";
- Delete the foreword of the international standard;
- For the international standards that are quoted by ISO 11890-2:2006, if those have been equivalently adopted by the corresponding Chinese standards, then use the corresponding Chinese standards to replace; if those are not equivalently adopted by Chinese standards, then directly quote those international standards;

--- Delete the Part 2 of the international standard;

--- Because, currently in domestic market, the majority of determination of water content in paint adopts gas chromatography, therefore, ADD content note 3 in 9.2.

In this Standard, Appendix A is normative, Appendix B is informative.

This Standard was proposed by China Petroleum and Chemical Industry Association.

This Standard shall be under the jurisdiction of National Standardization Technical Committee of Paint and Color Industry.

Drafting organizations of this Standard. CNOOC Changzhou Painting Chemical Research Institute, Kunshan Shiming Technology Development Co., Ltd.

Chief drafting staffs of this Standard. Ji Junhong, Huang Ning, Du Changsen.

Paints and Varnishes - Determination of Volatile Organic Compound (VOC) Content - Gas-chromatographic Method

1 Scope

This Standard is one of a series of standards dealing with the sampling and testing of paints, varnishes and related products.

2 Normative references

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

GB/T 3186 Paint, Varnishes and raw materials for paint and varnish - Sampling (GB/T 3186-2006, ISO 15528:2000, IDT)

3 Terms and definitions

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

Mass of the volatile organic compounds present in a coating material, as determined under specified conditions.

4 Principle

After preparation of the sample, the VOCs are separated by a gas-chromatographic technique. Either a hot or a cold sample injection system is used, depending on the sample type. Hot injection is the preferred method.

5 Required supplementary information

For any particular application, the test method specified in this Standard needs to be completed by supplementary information. The items of supplementary information are given in Annex A.

6 Apparatus

The cold-injection system shall be provided with temperature programming for heating from ambient to 300°C and shall have a sample splitter inlet which is made of an inert material such as glass. The sample splitter shall be provided with silanized glass wool packing and shall be maintained as specified in 6.2.2. The split ratio shall be adjustable and capable of being monitored.

7 Reagents

Use an organic solvent suitable for diluting the sample. It shall have a purity of at least 99% (mass fraction) or shall be of known purity and it shall not contain any substances which interfere with the determination, e.g.

If the term VOC is being used for compounds whose boiling points are below a defined maximum limit (see Note 3 to 3.1), a marker compound of known purity and with a boiling point within $\pm 3^{\circ}\text{C}$ of the defined maximum limit shall be used.

8 Sampling

Take a representative sample of the product to be tested (or of each product in the case of a multi-coat system), as specified in GB/T 3186.

9 Procedure

If required by the calculation (see 10.4 and 10.5), determine the water content, as a percentage by mass, by the method given in GB/T 6283, selecting the reagents so that there will be no interference from the compounds contained in the sample. If the compounds are not known, then determine them qualitatively (see 9.4).

10 Calculation

Calculate the VOC content by the method specified in the referring specification. If no particular method is specified, calculate the VOC content by method 1.

11 Expression of results

If the two results (duplicates) differ by more than the maximum value indicated in 12.2, repeat the procedure.

12 Precision

The repeatability limit r is the value below which the absolute difference between two single test results, each the mean of duplicates, obtained on identical material by one operator in one laboratory within a short interval of time using the standardized test method, may be expected to lie.

The reproducibility for this test method, expressed as the reproducibility coefficient of variation, lies between 2% ~ 11%.

13 Test report

The test report shall contain at least the following information.

Annex A

(Normative)

Required supplementary information the items of supplementary information listed in this annex shall be supplied as appropriate to enable the method to be carried out.

Annex B

(Informative)

Examples of gas-chromatographic conditions