

ICS 87.040

CCS G 50



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

GB/T 23986.2-2023

Replacing GB/T 23986-2009

**Paints and varnishes - Determination of volatile organic
compounds (VOC) and/or semi volatile organic compounds
(SVOC) content - Part 2: Gas-chromatographic method**

Issued on: November 27, 2023

Implemented on: June 1, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
Introduction	
1 Scope	1
2 Normative references	1
3 Terms and Definitions	2
4 Principle	4
5 Required information	4
6 instruments	4
6:1 Gas Chromatograph	4
6:2 Column box	5
6:3 Detector	5
6:4 Capillary Column	5
6:5 Analyze system performance indicators	5
6:6 Qualitative analysis equipment	5
6:7 Syringe	6
6:8 Data processing	6
6:9 Sample vial	6
6:10 Gas filter	6
6:11 Gas	6
7 Reagents	6
7:1 General	6
7:2 Internal Standard	6
7:3 Alternative calibrators	7
7:4 Markers	7
7:5 Performance Indicators Compound	7
7:6 Calibrator	7
7:7 Extraction solvent	7
8 Test Step	7
8:1 Sampling	7
8:2 Analysis	7
8:3 Calibration	8
8:4 Quality Assurance	9

8:5 Gas Chromatography Conditions	9
8:6 Density	9
8:7 Moisture content	9
9 Data Analysis	9
9:1 Integration and Qualification of Compounds	9
9:2 Classification of compounds	11
10 Quantitative determination of compound content	12
10:1 General	12
10:2 Quantitative determination of compound content	14
11 Calculation of VOC content and SVOC content	15
11:1 General	15
11:2 Method 1: VOC content and/or SVOC content (mass fraction) of "ready-to-use" products	15

Foreword

This document complies with the provisions of GB/T 1:1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents"

Drafting:

This document is GB/T 23986 "Volatile organic compounds (VOC) and/or semi-volatile organic compounds in paints and varnishes"

Determination of (SVOC) Content?Part 2: GB/T 23986 has released the following parts:

---Part 2: Gas Chromatography:

This document replaces GB/T 23986-2009 "Determination of Volatile Organic Compounds (VOC) Content in Paints and Varnishes by Gas Chromatography"

"Law", compared with GB/T 23986-2009, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) Changed the "scope" (see Chapter 1, Chapter 1 of the:2009 edition);
- b) Added "semi-volatile organic compounds", "non-volatile organic compounds", "semi-volatile organic compounds content" and "internal standards"

Terms and definitions of "substitute calibrator", "marker", "retention time", "extraction solvent", "main peak", "secondary peak" and "reagent" (see Section 3

Chapter); change "to be tested" to "to be used" (see 3:7, 3:4 of the:2009 version);

- c) Changed the "principle" (see Chapter 4, Chapter 4 of the:2009 edition);

d) Changed "required supplementary information" to "required information" and changed the corresponding content (see Chapter 5, Chapter 5 of the:2009 edition

and Appendix A);

e) "Gas Chromatograph" (see 6:1, 6:1 and 6:2 of the:2009 edition), "Detector" (see 6:3, 6:4 of the:2009 edition), "Gas Chromatograph" (see 6:3, 6:4 of the:2009 edition), "Glass

"Slim tube column" (see 6:4, 6:5 in the:2009 edition), "Qualitative analysis equipment" (see 6:6, 6:6 in the:2009 edition); "Analysis system" was added

"Performance indicators of the system" (see 6:5) and "Data processing" (see 6:8); deleted "Graph recorder" (see 6:8 in the:2009 version) and

"Integrator" (see 6:9 of the:2009 edition);

f) "Standard compound" was changed to "calibrator", and the corresponding requirements were changed (see 7:6, 7:2 of the:2009 version), and the "internal standard" was changed:

"substance" (see 7:2, 7:1 of the:2009 edition), "marker" (see 7:4, 7:4 of the:2009 edition), "extraction solvent" (see 7:7, :2009 edition of

Version 7:3); Added "General Principles" (see 7:1), "Substitute Calibrants" (see 7:3), and "Performance Index Compounds" (see 7:5);

g) Change "Quantitative determination of compound content" to "Data collection for sample measurement", and change the corresponding requirements (see 8:2:2,:2009

9:7 of the:2009 edition), changed "Sampling" (see 8:1, Chapter 8 of the:2009 edition) and "Sample Preparation" (see 8:2:1, Chapter 8 of the:2009 edition)

9:6), "Calibration" (see 8:3, 9:5 of the:2009 edition), "Gas Chromatography Conditions" (see 8:5, 9:3 of the:2009 edition), "Moisture content"

(See 8:7, 9:2 of the:2009 version); Added "Quality Assurance" (see 8:4);

h) Added "Data Analysis" (see Chapter 9);

i) Added "Quantitative determination of compound content" (see Chapter 10);

j) Added the calculation formulas for VOC content and SVOC content (see 11:6);

k) Changed "Representation of results" to "Data evaluation and calculation of final results", and changed the corresponding content (see Chapter 12,:2009

version of Chapter 11);

l) "Precision" has been changed (see Chapter 13, Chapter 12 of the:2009 edition);

m) Changed the "Test Report" (see Chapter 14, Chapter 13 of the:2009 edition):

This document is modified using ISO 11890-2:2020 "Volatile organic compounds (VOC)

and/or semi-volatile organic compounds in paints and varnishes"

Determination of compound (SVOC) content Part 2: Gas chromatography method:

Compared with ISO 11890-2:2020, this document has made the following structural adjustments:

- 6:1:1 corresponds to 6:1 in ISO 11890-2:2020;
- 6:1:2 corresponds to 6:1:1 in ISO 11890-2:2020;
- 6:1:3 corresponds to 6:1:2 in ISO 11890-2:2020;
- 6:1:4 corresponds to 6:1:3 in ISO 11890-2:2020;
- Changed the format of the detector description in 6:3 to column items;
- Appendix A corresponds to Appendix B in ISO 11890-2:2020;
- Appendix B corresponds to Appendix C in ISO 11890-2:2020;
- Appendix C corresponds to Appendix A in ISO 11890-2:2020:

The technical differences between this document and ISO 11890-2:2020 and their reasons are as follows:

- Added the method of measuring moisture content in coatings using ISO 23168 (see 8:7), increasing the success rate of widespread use in my country's coatings industry

methods to improve the applicability of this document;

- Added sample weighing accuracy requirements (see 8:2:1) to improve the operability of this document;

- Added the calculation method of VOC content and/or SVOC content (mass fraction) of "ready-to-use" products after deducting water (see

11:6), adapt to the usage habits of relevant fields in my country to improve the applicability of this document:

The following editorial changes have been made to this document:

- A description of the method has been added to the scope;
- Standardizes the presentation of long-chain alkane compounds in this document;
- Added Note 3 in 8:7, optimized the precision, and explained the simplified processing of trace moisture content in the extraction solvent;
- Changed the item number in 9:1;
- Changed the editorial error in Figure 4, changing "VOC markers < TR <=VOC markers" to "VOC markers < TR