INTERNATIONAL STANDARD

ISO 11890-1

Second edition
2007-07-01

Paints and varnishes — Determination of volatile organic compound (VOC) content —

Part 1: Difference method

Peintures et vernis — Détermination de la teneur en composés organiques volatils (COV) —

Partie 1: Méthode par différence

Reference number
ISO 11890-1:2007(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ... iv
1 Scope ... 1
2 Normative references ... 1
3 Terms and definitions ... 2
4 Principle ... 2
5 Required supplementary information ... 3
6 Sampling ... 3
7 Procedure ... 3
8 Calculation ... 4
9 Expression of results ... 5
10 Precision ... 6
11 Test report ... 7
Annex A (normative) **Required supplementary information** ... 8
Bibliography ... 9

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 11890-1 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 11890-1:2000), which has been technically revised. The main change is that, in order to allow the method to be used for multi-component systems as well as single-component systems, the test portion preparation procedures for the determination of the non-volatile-matter content of each of these two types of system has been included in Subclause 7.4.

ISO 11890 consists of the following parts, under the general title *Paints and varnishes — Determination of volatile organic compound (VOC) content*:

— *Part 1: Difference method*
— *Part 2: Gas-chromatographic method*

Paints and varnishes — Determination of volatile organic compound (VOC) content —

Part 1: Difference method

1 Scope

This part of ISO 11890 is one of a series of standards dealing with the sampling and testing of paints, varnishes and related products.

It specifies a method for the determination of the volatile organic compound (VOC) content of paints, varnishes and their raw materials. This part may be used where the expected VOC content is greater than 15 % by mass. When the expected VOC content is greater than 0,1 % by mass and less than 15 % by mass, ISO 11890-2 should be employed.

This method assumes that the volatile matter is either water or organic. However, other volatile inorganic compounds can be present and might need to be quantified by another suitable method and allowed for in the calculations.

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.

ISO 760, *Determination of water — Karl Fischer method (General method)*

ISO 1513, *Paints and varnishes — Examination and preparation of samples for testing*

ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pyknometer method*

ISO 2811-2, *Paints and varnishes — Determination of density — Part 2: Immersed body (plummet) method*

ISO 2811-3, *Paints and varnishes — Determination of density — Part 3: Oscillation method*

ISO 2811-4, *Paints and varnishes — Determination of density — Part 4: Pressure cup method*

ISO 3251:2003, *Paints, varnishes and plastics — Determination of non-volatile-matter content*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 11890-2, *Paints and varnishes — Determination of volatile organic compound (VOC) content — Part 2: Gas-chromatographic method*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Terms and definitions

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

3.1
volatile organic compound
VOC
any organic liquid and/or solid that evaporates spontaneously at the prevailing temperature and pressure of the atmosphere with which it is in contact

NOTE 1 As to correct usage of the term VOC in the field of coating materials, see volatile organic compound content (VOC content).

NOTE 2 Under U.S. government legislation, the term VOC is restricted solely to those compounds that are photochemically active in the atmosphere (see ASTM D 3960). Any other compound is defined as being an exempt compound.

[ISO 4618:2006]

NOTE 3 Under European legislation, EU Directive 2004/42/EC, the term VOC refers to volatile organic compounds with boiling points up to 250 °C, measured at a standard pressure of 101,3 kPa.

3.2
volatile organic compound content
VOC content
mass of the volatile organic compounds present in a coating material, as determined under specified conditions

NOTE 1 The properties and the amounts of the compounds to be taken into account will depend on the field of application of the coating material. For each field of application, the limiting values and the methods of determination or calculation are stipulated by regulations or by agreement.

[ISO 4618:2006]

NOTE 2 If the term VOC refers to compounds with a defined maximum boiling point (see Note 3 to 3.1), the compounds considered to be part of the VOC content are those with boiling points below that limit and compounds with higher boiling points are considered to be non-volatile organic compounds.

3.3
exempt compound
organic compound that does not participate in atmospheric photochemical reactions

NOTE See Notes 2 and 3 to 3.1.

3.4
ready for use
state of a product when it is mixed in accordance with the manufacturer's instructions in the correct proportions and thinned, if required, using the correct thinners so that it is ready for application by the approved method

4 Principle

After preparation of the sample, the non-volatile matter content is determined in accordance with ISO 3251, and the water content is determined using a titration technique employing Karl Fischer reagent in accordance with ISO 760. The contents of exempt compounds, if applicable, are then determined using the method specified in ISO 11890-2. The VOC content of the sample is then calculated.