



**SLOVENSKI STANDARD**  
**SIST EN ISO 11890-2:2007**

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Paints and varnishes - Determination of volatile organic compound (VOC) content - Part 2: Gas-chromatographic method (ISO 11890-2:2006)

Beschichtungsstoffe - Bestimmung des Gehaltes an flüchtigen organischen Verbindungen (VOC-Gehalt) - Teil 2: Gaschromatographisches Verfahren (ISO 11890-2:2006)

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Peintures et vernis - Détermination de la teneur en composés organiques volatils (COV) - Partie 2: Méthode par chromatographie en phase gazeuse (ISO 11890-2:2006)

Ta slovenski standard je istoveten z: **EN ISO 11890-2:2006**

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English Version

Paints and varnishes - Determination of volatile organic compound (VOC) content - Part 2: Gas-chromatographic method (ISO 11890-2:2006)

Peintures et vernis - Détermination de la teneur en composés organiques volatils (COV) - Partie 2: Méthode par chromatographie en phase gazeuse (ISO 11890-2:2006)

Beschichtungsstoffe - Bestimmung des Gehaltes an flüchtigen organischen Verbindungen (VOC-Gehalt) - Teil 2: Gaschromatographisches Verfahren (ISO 11890-2:2006)

This European Standard was approved by CEN on 11 November 2006.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN ISO 11890-2:2006) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 "Paints and varnishes", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2007, and conflicting national standards shall be withdrawn at the latest by May 2007.

This document supersedes EN ISO 11890-2:2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

### Endorsement notice

The text of ISO 11890-2:2006 has been approved by CEN as EN ISO 11890-2:2006 without any modifications.

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

**Part 2:  
Gas-chromatographic method**

iTeh STANDARD PREVIEW

*Peintures et vernis — Détermination de la teneur en composés  
organiques volatils (COV)*  
(standard iTeh.ai)

*Partie 2: Méthode par chromatographie en phase gazeuse*

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## 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 11890-2 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 11890-2:2000), which has been technically revised. The main changes are:

- the method has been modified to allow the determination of the VOC content when the term refers to compounds with a well-defined boiling point;
- the calculation of the VOC content of a product “ready for use” less water and less exempt compounds (see 10.5) has been modified to make it clear that only those components that are not exempt compounds are considered.

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 2: Gas-chromatographic 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 is preferred if the expected VOC content is greater than 0,1 % by mass and less than about 15 % by mass. When the VOC content is greater than about 15 % by mass, the less complicated method given in ISO 11890-1 may be used.

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

[SIST EN ISO 11890-2:2007](https://standards.iteh.ai/catalog/standards/sist/4f1789a8-2abe-4881-b1cc-b080b2415b7a/sist-en-iso-11890-2-2007)

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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 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 current 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 then 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 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. After the compounds have been identified, they are quantified from the peak areas using an internal standard. Depending on the equipment used, it may also be possible to determine the water content by this method. A calculation is then performed to give the VOC content of the sample.

## 5 Required supplementary information

For any particular application, the test method specified in this part of ISO 11890 needs to be completed by supplementary information. The items of supplementary information are given in Annex A.

## 6 Apparatus

### 6.1 Gas chromatograph

The apparatus shall be set up and used in accordance with the manufacturer's instructions. All of the instrumental parts coming into contact with the test sample shall be made of a material (e.g. glass) which is resistant to the sample and will not change it chemically.

### 6.2 Sample injection system

#### 6.2.1 General

Use one of the two types specified in 6.2.2 and 6.2.3.

#### 6.2.2 Hot-injection system with sample splitter (preferred system)

The instrument shall have a variable-temperature injection block with a sample splitter. The injection temperature shall be capable of being set to an accuracy of 1 °C. The split ratio shall be adjustable and capable of being monitored. The sample splitter insert shall contain silanized glass wool to retain non-volatile constituents, and shall be cleaned and provided with new glass wool packing or replaced as required to rule out errors due to residues of binder or pigment (i.e. adsorption of compounds). The occurrence of adsorption is revealed by peak tailing, in particular with components of low volatility.

#### 6.2.3 Cold-injection system with sample splitter

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.

Method precision will be increased if the injection system, especially the hot-injection system, is coupled to an auto-injector. The manufacturer's instructions shall be followed when an auto-injector is used.

#### 6.2.4 Selection of sample injection system

The choice between hot-injection and cold-injection will depend on the type of product under test. It will be necessary to use the cold-injection system for products which at high temperature release substances which interfere with the determination.

Indications of cleavage or decomposition reactions may be obtained by looking for changes in the chromatogram (for example the occurrence of foreign peaks or an increase or decrease in peak size) at various sample injector temperatures.

The hot-injection system covers all of the volatile constituents, compounds and cleavage products of the binders and additives. Cleavage products of the binders or additives which are identical to a constituent of the product can be separated by a cold-injection system, since they elute later as a result of the programmed increase in injection block temperature.