



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 11890-1:2023**  
**01-oktober-2023**

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**Barve in laki - Določevanje hlapnih organskih spojin (VOC) in/ali polhlapnih organskih spojin (SVOC) - 1. del: Gravimetrijska metoda za določevanje hlapnih organskih spojin (VOC) (ISO/DIS 11890-1:2023)**

Paints and varnishes - Determination of volatile organic compounds (VOC) and/or semi volatile organic compounds (SVOC) content - Part 1: Gravimetric method for VOC determination (ISO/DIS 11890-1:2023)

Beschichtungsstoffe - Bestimmung des Gehaltes an flüchtigen organischen Verbindungen (VOC) und/oder schwerflüchtigen organischen Verbindungen (SVOC) - Teil 1: Gravimetrisches Verfahren zur VOC-Bestimmung (ISO/DIS 11890-1:2023)

Peintures et vernis - Détermination de la teneur en composés organiques volatils (COV) et/ou composés organiques semi-volatils (COSV) - Partie 1: Titre manque (ISO/DIS 11890-1:2023)

**Ta slovenski standard je istoveten z: prEN ISO 11890-1**

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**ICS:**

87.040 Barve in laki Paints and varnishes

**oSIST prEN ISO 11890-1:2023 en,fr,de**



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### Paints and varnishes — Determination of volatile organic compounds (VOC) and/or semi volatile organic compounds (SVOC) content —

#### Part 1: Gravimetric method for VOC determination

ICS: 87.040

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## ISO/DIS 11890-1:2023(E)

### 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 16, *Chemical analysis*.

This third edition cancels and replaces the second edition (ISO 11890-1:2007), which has been technically revised.

The main changes compared to the previous edition are as follows:

- In the scope, for coating materials, other than coating materials containing reactive diluent and radiation curable coating materials the expected VOC content that can be determined by this standard is lowered from greater than 15 % to greater than 5%, and matrices that cannot be covered by this standard have been added;
- the scope has been expanded to include the coating materials containing reactive diluent and radiation curable coating materials;
- the scope has been expanded to include multi-pack coating materials the test method of non-volatile-matter content for multi-pack coating materials and coating materials containing reactive diluent and radiation curable coating materials have been modified on the basis of ISO 3251;
- the test method of non-volatile-matter content for coating materials containing reactive diluent and radiation curable coating materials has been added.

A list of all parts in the ISO 11890 series can be found on the website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Due to the revision of ISO 11890-2, a revision of ISO 17895 and ISO 11890-1 became necessary in order to avoid overlapping scopes. Additionally a new Technical Specification (ISO/TR 5601) was created as a guidance document to help users selecting the appropriate analytical method for their analytical problem.

Coating materials containing, i.e. reactive diluents, radiation curable coating materials and multi-pack product, have been added. Because some of the VOC in these coating materials do not directly volatilize into the environment, but become part of the coating through chemical reactions, the corresponding test method of non-volatile-matter content has also been modified on the basis of ISO 3251.

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# Paints and varnishes — Determination of volatile organic compounds (VOC) and/or semi volatile organic compounds (SVOC) content —

## Part 1: Gravimetric method for VOC determination

**WARNING** — The use of this document can involve hazardous materials, operations and equipments. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel prior to the application of the standard, and to determine the applicability of any other restrictions for this purpose.

### 1 Scope

This document is one of a series of standards dealing with the sampling and testing of coating materials and their raw materials.

This document is applicable to the determination of VOC content if the cases are as follows:

Case 1: single-pack coating materials other than case 3 and the expected VOC content is greater than a mass fraction of 5 % which cannot be measured by ISO 11890-2 due to chemical reactions;

Case 2: multi-pack coating materials other than case 3, including coating materials containing reactive diluent, and the expected VOC content is greater than a mass fraction of 1 % ;

Case 3: radiation curable coating materials and the expected VOC content is greater than a mass fraction of 5 %; . Radiation curable coating materials in this document include coating materials that are cured by UV, electron beam, and other radiation methods.

If the system of the first case contains SVOC, the VOC result may be influenced by SVOC, see [Annex D](#). In this case ISO 11890-2 shall be preferred. ISO 11890-1 cannot be used for the determination of the SVOC content. In water-borne coating materials, if the water content is much greater than VOC content and VOC content is less than a mass fraction of 10 %, ISO 11890-2 shall be preferred.

In the third case, the main purpose measured is VOC. However, it needs to be clarified that this VOC content can also contain SVOC. The real VOC content may be lower than the VOC content measured by ISO 11890-1.

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. The method defined in this document is not applicable for determination of water content.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 test samples*

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ISO 2811 (all parts), *Paints and varnishes — Determination of density*

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

ISO/TR 5601, *Paints and varnishes — Determination of volatile organic compound (VOC) and/or semi-volatile organic compound (SVOC) content — Best practices for the selection of test methods*

ISO 11890-2, *Paints and varnishes — Determination of volatile organic compounds(VOC) and/or semi-volatile organic compounds (SVOC) content — Part 2: Gas-chromatographic method*

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

ISO 23168, *Paints and varnishes — Determination of water content — Gas-chromatographic method*

**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

**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 to entry: As to current usage of the term VOC in the field of coating materials, see volatile organic compounds content (VOC content, [3.3](#)).

Note 2 to entry: Under US government legislation, the term VOC is restricted solely to those compounds that are photochemically active in the atmosphere (see ASTM D3960). Any other compound is then defined as being an exempt compound.

[SOURCE: ISO 4618:2014, 2.270]

**3.2**  
**semi-volatile organic compound**  
**SVOC**  
any organic liquid and/or solid that evaporates spontaneously but slower in comparison to VOC at the prevailing temperature and pressure of the atmosphere with which it is in contact

Note 1 to entry: As to current usage of the term SVOC in the field of coating materials, see semi-volatile organic compounds content (SVOC content, [3.4](#)).

[SOURCE: ISO 4618:2014, 3.2]

**3.3**  
**volatile organic compounds content**  
**VOC content**  
**VOCC**  
mass of *volatile organic compounds* ([3.1](#)) present in a coating material, as determined under specified conditions

Note 1 to entry: 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.

Note 2 to entry: If the term VOC refers to compounds with a defined maximum boiling point, the compounds considered to be part of the VOC content are those with boiling points below and including that limit, and compounds with higher boiling points are considered to be semi-volatile or non-volatile organic compounds.

[SOURCE: ISO 4618:2014, 3.220, modified — Note 2 entry has been added]

### 3.4

#### **semi-volatile organic compounds content**

##### **SVOC content**

##### **SVOCC**

mass of the *semi-volatile organic compounds* (3. 2) present in a coating material, as determined under specified conditions

Note 1 to entry: 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.

Note 2 to entry: If the term SVOC refers to compounds with a defined maximum boiling point and minimum boiling point, the compounds considered to be part of the SVOC content are those with boiling points below and including the upper and above the lower limit, and compounds with higher boiling points are considered to be non-volatile organic compounds.

[SOURCE: ISO 4618:2014, 3.221]

### 3.5

#### **non-volatile organic compound**

##### **NVOC**

organic liquid and/or solid not classified as VOC or SVOC

[SOURCE: ISO 11890-2:2020, 3.3]

### 3.6

#### **reactive diluents**

reactive diluents are substances which can reduce the viscosity of a *coating material* during application and become part of the coating after its subsequent curing via copolymerization. For example, glycidyl ethers used in epoxy resin coatings, styrene used in unsaturated polyester resin coatings, polycaprolactone diol and polyethylene glycol used in high solid coatings

### 3.8

#### **radiation curable coating materials**

coating materials that are cured by radiation, such as ultra-violet radiation or electron beam

### 3.14

#### **multi-pack product**

coating material that is supplied in two or more separate components which have to be mixed before use in the proportions specified by the manufacturer

[SOURCE: ISO 4618:2014, 2.162]

### 3.11

#### **non-volatile matter**

##### **NV**

residue by mass obtained by evaporation under specified conditions

[SOURCE: ISO 4618:2014, 2.176]

### 3.9

#### **UV curing**

hardening of *coating materials* by exposure to ultra-violet radiation

[SOURCE: ISO 4618:2014, 2.265]