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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

Peintures et vernis — Détermination de la teneur en composés organiques volatils (COV) et/ou composés organiques semi-volatils (COSV) —

Partie 1: Méthode gravimétrique pour la détermination des COV

Reference number
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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.

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 document 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).

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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.

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 are as follows:

— In the scope, for coating materials identified as case 1, the expected VOC content that can be determined by this document has been lowered from greater than 15 % to greater than 5 %, and matrices that were not previously covered by this document have been added;

— the scope has been expanded to include multi-pack coating materials, described as case 2 and radiation curable coating materials, described as case 3;

— the test method of non-volatile-matter content for multi-pack coating materials 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.

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Introduction

Due to the revision of ISO 11890-2, a revision of ISO 17895 and this document became necessary in order to avoid overlapping scopes. Additionally, ISO/TR 5601 was published as an informative document to help users selecting the appropriate analytical method for their analytical problem.

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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 equipment. 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 document, and to determine the applicability of any other restrictions for this purpose.

1 Scope

This document is part of the ISO 11890 series, dealing with the sampling and testing of coating materials and their raw materials.

This document is applicable to the determination of volatile organic compound (VOC) content in the following cases:

— case 1: where there are single-pack coating materials other than case 3, and the expected VOC content is greater than a mass fraction of 5 %, including single-pack coating materials cure not through chemical reactions and single-pack coating materials which cannot be measured by ISO 11890-2 due to chemical cure reactions or gas chromatography temperatures leading to formation of new compounds that would not appear under normal cure conditions and impacts VOC/SVOC calculation.;

— case 2: where there are multi-pack coating materials other than case 3 and the expected VOC content is greater than a mass fraction of 1 %;

— case 3: where there are 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, but do not cure through chemical reactions, the VOC result can be influenced by SVOC, see Annex C. In this case, ISO 11890-2 is preferred. ISO 11890-1 cannot be used for the determination of the SVOC content. In water-borne coating materials, that do not cure through chemical reactions, if the water content is much greater than VOC content and VOC content is less than a mass fraction of 10 %, ISO 11890-2 is preferred.

For all three cases, the main purpose measured is VOC. However, clarify that this VOC content can also contain SVOC. The real VOC content can be lower than the VOC content measured by ISO 11890-1.

The method specified in this document assumes that the volatile matter is either water or organic. However, it is possible that other volatile inorganic compounds are present which can require another suitable method for quantification, which is thus allowed for in the calculations. The method defined in this document is not applicable for determination of water content.

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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*

ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pycnometer 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, *Paints, varnishes and plastics — Determination of non-volatile-matter content*

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 terminology 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
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 compound 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.

Note 3 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 4618:2023, 2.266]

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