
Indoor air —

Part 11:

Determination of the emission of volatile organic compounds from building products and furnishing — Sampling, storage of samples and preparation of test specimens

Air intérieur —

Partie 11: Dosage de l'émission de composés organiques volatils de produits de construction et d'objets d'équipement — Échantillonnage, conservation des échantillons et préparation d'échantillons pour essai

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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 16000-11 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 264, *Air quality*, in collaboration with Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 16000 consists of the following parts, under the general title *Indoor air*:

- *Part 1: General aspects of sampling strategy*
- *Part 2: Sampling strategy for formaldehyde*
- *Part 3: Determination of formaldehyde and other carbonyl compounds — Active sampling method*
- *Part 4: Determination of formaldehyde — Diffusive sampling method*
- *Part 5: Measurement strategy for volatile organic compounds (VOCs)*
- *Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID*
- *Part 7: Sampling strategy for determination of airborne asbestos fibre concentrations*
- *Part 8: Determination of local mean ages of air in buildings for characterizing ventilation conditions*
- *Part 9: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test chamber method*
- *Part 10: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test cell method*
- *Part 11: Determination of the emission of volatile organic compounds from building products and furnishing — Sampling, storage of samples and preparation of test specimens*

The following parts are under preparation:

- *Part 12: Sampling strategy for polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzo-furans (PCDFs) and polychlorinated biphenyls (PCBs)*

- *Part 13: Determination of total (gas and particle-phase) polychlorinated dioxin-like biphenyls and polychlorinated dibenzo-p-dioxins/dibenzofurans — Collection on sorbent-backed filters with high-resolution gas chromatographic/mass spectrometric analysis*
- *Part 14: Sampling strategy for nitrogen dioxide (NO₂)*
- *Part 15: Measurement of nitrogen dioxide (NO₂)*
- *Part 16: Detection and enumeration of moulds — Sampling of moulds by filtration*
- *Part 17: Detection and enumeration of moulds — Culture-based method*

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Introduction

The determination of volatile organic compounds (VOCs) emitted from building products using emission test chambers in conjunction with the standardised sampling, storage of samples and preparation of test specimens has objectives such as:

- to provide manufacturers, builders, and end users with emission data useful for the evaluation of the impact of building products on the indoor air quality;
- to promote the development of improved products.

The method can in principle be used for most building products used indoors.

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Indoor air —

Part 11:

Determination of the emission of volatile organic compounds from building products and furnishing — Sampling, storage of samples and preparation of test specimens

1 Scope

Studies of the emission of volatile organic compounds from unused building products or furnishing in test chambers or cells require proper handling of the product prior to testing, and during the testing period.

This part of ISO 16000 defines three types of building products or furnishing: solid, liquid and combined. For each type, specifications are given for the sampling procedures, transport conditions, storage, and substrate used that can affect emissions of volatile organic compounds. For individual products, the preparation of a test specimen for each type is prescribed.

NOTE Depending on the non-homogeneity of the product, it can be necessary to make measurements on different test specimens to determine the specific emission rate.

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.

EN 1937, *Test method for hydraulic setting floor smoothing and/or levelling compounds — Standard mixing procedures*

ISO 16000-9, *Indoor air — Part 9: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test chamber method*

ISO 16000-10, *Indoor air — Part 10: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test cell method*

EN 13892-1, *Methods of test for screed materials — Part 1: Sampling, making and curing specimens for test*

ISO 3251:1993, *Paints and varnishes — Determination of non-volatile matter of paints, varnishes and binders for paints and varnishes*

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 3233, *Paints and varnishes — Determination of percentage volume of non-volatile matter by measuring the density of a dried coating*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16000-9 and ISO 16000-10, and the following apply.

3.1 solid product
(building product or furnishing) resilient or rigid product whose properties meet user-specifications directly without a transition phase, e.g. curing or drying

EXAMPLE 1 Examples of resilient products are several insulation products, flexible flooring and wall coverings.

EXAMPLE 2 Examples of rigid products are tiles, parquets, laminated floorings, wall construction products, such as chip- and gypsum boards, wood panels, ceiling materials, acoustic panels, and doors etc.

3.2 liquid product
(building product or furnishing) product whose properties meet the user-specifications after a transition phase, e.g. curing or drying

EXAMPLE Examples of liquid products are paints, varnishes, oils, waxes, levelling compounds, plasters, mortars, concrete, adhesives, sealants, caulks, putties, and surface coatings.

NOTE 1 Liquid products can have a wide range of viscosity and are supplied to the user in containers, such as cans, tubes, bottles, and sacks and are applied on the site.

NOTE 2 Some liquid products need the addition of water before they can be applied.

3.3 combined product
(building product or furnishing) combined product formed on-site by the combination of more than one solid or liquid product

EXAMPLE Examples are glued applications such as floor and wall coverings that are fixed on the site on surfaces using adhesives.

NOTE When liquid products as paints, oils and waxes are spread on an absorbing surface such as wood and gypsum board etc, the systems are considered to be combined.

4 Sampling the product and transport and storage of sample

4.1 Sampling of the product to be tested

Product samples collected at the point of manufacture shall be taken as soon as possible after the normal manufacturing process. Product samples can also be collected from retail stores.

4.2 Sample packaging and transport

Samples shall be thoroughly protected from chemical contamination or any physical exposure, e.g. heat, light and humidity.

For solid products, this can usually be achieved by wrapping each specimen separately in aluminium foil and in a polyethylene bag or alternatively, in aluminised packaging lined with polyethylene or clear polyvinyl fluoride film. Liquid products shall be shipped in unopened cans, tubes, etc.

NOTE Transportation of collected samples can affect the emission characteristics of the product. The possible effects of temperature and humidity are of particular concern.

4.3 Sample description

The sample shall be labelled with the details of the type of product, week of manufacture (if known) and/or any identification numbers, e.g. batch numbers (see also Clause 15 in ISO 16000-9 and ISO 16000-10).

4.4 Storage of the sample prior to starting the testing

In many cases, it can be necessary to store the sample in the laboratory before starting the test. The sample shall be kept in its package, see 4.2, and stored at normal indoor conditions during any period of storage.

Storage may affect the emission properties due to ageing of the sample. It is recommended to minimise the storage time of the sample prior to preparation of the test specimen.

5 Preparation of test specimens

The preparation of test specimens of different product classes are prescribed in the annexes. The period of time between the unpacking and preparation of the test specimen shall be as short as possible and shall be recorded. After the completion of the test specimen, it shall immediately be put in the conditioned storage in accordance with 12.3 of ISO 16000-9 and ISO 16000-10, or in the emission test chamber, or in the emission test cell. This time shall be regarded as the starting time of the emission test, i.e. $t = t_0$.

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Annex A (normative)

Solid products — Procedure for sampling and test specimen preparation

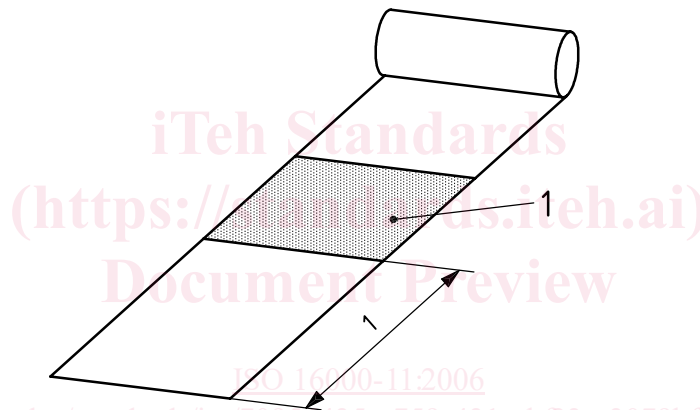
A.1 General

This method covers only unused products.

A.2 Sampling

A.2.1 Selection of samples from rolls (see Figure A.1)

Dimensions in metres



Key

1 sample

Figure A.1 — Procedure for sampling of solid products from rolls

Discard one meter, or at least the outer layer, of the roll to take the sample.

The sample shall have an area appropriate to the test chamber or cell.

After taking the sample, it is rolled across the direction of the production roll, secured with staples, wrapped in aluminium foil, and placed in an unprinted, airtight polyethylene bag and sealed. Each bag shall contain only one sample.

Not more than 1 h shall elapse from the time of taking the sample to packing it. The packed samples shall be sent to the testing laboratory with the shortest possible delay.

A.2.2 Selection of samples of rigid products

Send an unopened standard package of the product to the testing laboratory.