

# **SLOVENSKI STANDARD**

## **oSIST ISO/DIS 16000-23:2018**

**01-september-2018**

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**Notranji zrak - 23. del: Zmogljivostni preskus za vrednotenje zmanjšanja koncentracije formaldehida in drugih karbonilnih spojin z vpojnimi stavbnimi gradbenimi materiali**

Indoor air - Part 23: Performance test for evaluating the reduction of formaldehyde and other carbonyl compounds concentrations by sorptive building materials

Air intérieur - Partie 23: Essai de performance pour l'évaluation de la réduction des concentrations en formaldéhyde par des matériaux de construction sorptifs

**Ta slovenski standard je istoveten z: ISO/DIS 16000-23**

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**ICS:**

13.040.20      Kakovost okoljskega zraka      Ambient atmospheres

**oSIST ISO/DIS 16000-23:2018**

**en,fr**



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 16000-23

ISO/TC 146/SC 6

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### Indoor air —

#### Part 23:

### Performance test for evaluating the reduction of formaldehyde concentrations by sorptive building materials

*Air intérieur —*

*Partie 23: Essai de performance pour l'évaluation de la réduction des concentrations en formaldéhyde par des matériaux de construction sorptifs*

ICS: 13.040.20

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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
[copyright@iso.org](mailto:copyright@iso.org)  
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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 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 on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 146/SC 6 "Indoor air".

This second edition cancels and replaces the first edition (2009), clauses of which have been technically revised.

ISO 16000 consists of the following parts:

- Part 1: General aspects of sampling strategy
- Part 2: Sampling strategy for formaldehyde
- Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method
- Part 4: Determination of formaldehyde — Diffusive sampling method
- Part 5: Sampling 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 or 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

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- Part 12: Sampling strategy for polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and polycyclic aromatic hydrocarbons (PAHs)
- Part 13: Determination of total (gas and particle-phase) polychlorinated dioxin-like biphenyls (PCBs) and polychlorinated dibenzo-p-dioxins/dibenzofurans (PCDDs/PCDFs) — Collection on sorbent-backed filters
- Part 14: Determination of total (gas and particle-phase) polychlorinated dioxin-like biphenyls (PCBs) and polychlorinated dibenzo-p-dioxins/dibenzofurans (PCDDs/PCDFs) — Extraction, clean-up and analysis by high-resolution gas chromatography and mass spectrometry
- Part 15: Sampling strategy for nitrogen dioxide (NO<sub>2</sub>)
- Part 16: Detection and enumeration of moulds — Sampling by filtration
- Part 17: Detection and enumeration of moulds — Culture-based method
- Part 18: Detection and enumeration of moulds — Sampling by impaction
- Part 19: Sampling strategy for moulds
- Part 20: Detection and enumeration of moulds — Determination of total spore count
- Part 21: Detection and enumeration of moulds — Sampling from materials
- Part 23: Performance test for evaluating the reduction of formaldehyde concentrations by sorptive building materials
- Part 24: Performance test for evaluating the reduction of volatile organic compound (except formaldehyde) concentrations by sorptive building materials
- Part 25: Determination of the emission of semi-volatile organic compounds by building products — Micro-chamber method
- Part 26: Sampling strategy for carbon dioxide (CO<sub>2</sub>)
- Part 27: Determination of settled fibrous dust on surfaces by SEM (scanning electron microscopy) (direct method)
- Part 28: Determination of odour emissions from building products using test chambers
- Part 29: Test methods for VOC detectors
- Part 30: Sensory testing of indoor air
- Part 31: Measurement of flame retardants and plasticizers based on organophosphorus compounds — Phosphoric acid ester
- Part 32: Investigation of buildings for the occurrence of pollutants
- Part 33: Determination of phthalates with gas chromatography/mass spectrometry (GC/MS)

The following parts are under preparation:

- Part 34: Strategies for the measurement of airborne particles (PM<sub>2,5</sub> fraction)
- Part 35: Measurement of polybrominated diphenylether, hexabromocyclododecane and hexabromobenzene
- Part 36: Test method for the reduction rate of airborne bacteria by air purifiers using a test chamber
- Part 37: Strategies for the measurement of PM<sub>2,5</sub>



- Part 38: Determination of amines in indoor and test chamber air — Active sampling on samplers containing phosphoric acid impregnated filters
- Part 39: Determination of amines in indoor and test chamber air — Analysis of amines by means of high-performance liquid chromatography (HPLC) coupled with tandem mass spectrometry (MS MS)
- Part 40: Indoor air quality measurement system

Furthermore

- ISO 12219-1 Interior air of road vehicles — Part 1: Whole vehicle test chamber — Specification and method for the determination of volatile organic compounds in cabin interiors
- ISO 12219-2 Interior air of road vehicles — Part 2: Screening method for the determination of the emissions of volatile organic compounds from vehicle interior parts and materials — Bag method
- ISO 12219-3 Interior air of road vehicles — Part 3: Screening method for the determination of the emissions of volatile organic compounds from vehicle interior parts and materials — Micro-scale chamber method
- ISO 12219-4 Interior air of road vehicles — Part 4: Method for the determination of the emissions of volatile organic compounds from vehicle interior parts and materials — Small chamber method
- ISO 12219-5 Interior air of road vehicles — Part 5: Static chamber method
- ISO 12219-6 Interior air of road vehicles — Part 6: Method for the determination of the emissions of semi-volatile organic compounds from vehicle interior parts and materials at higher temperature – Small chamber method
- ISO 12219-7 Interior air of road vehicles — Part 7: Odour determination in interior air of road vehicles and test chamber air of trim components by olfactory measurements
- ISO 16017-1, Indoor, ambient and workplace air — Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography — Part 1: Pumped sampling
- ISO 16017-2, Indoor, ambient and workplace air — Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography — Part 2: Diffusive sampling

focus on volatile organic compound (VOC) measurements.

**ISO/DIS 16000-23:2017(E)****Introduction**

Sorptive building materials have been marketed in the form of sheet and board products for removing airborne pollutants via physical sorption or chemical reaction.

Harmonized test methods for evaluating sorptive effects are important for comparative assessment of the performance of sorptive building materials that are used for reducing levels of indoor air contaminants.

This part of ISO 16000 specifies procedures for evaluating the performance of sorptive building materials for reducing indoor air formaldehyde and other carbonyl compounds concentrations over time.

The performance of sorptive building materials is evaluated by area specific reduction rate and saturation mass per area and is affected by a number of factors. Specific test conditions are therefore defined in this part of ISO 16000.

This part of ISO 16000 can be applied to most sorptive building materials used indoors and for formaldehyde and other carbonyl compounds as an indoor air contaminant.

This part of ISO 16000 is based on the test chamber method as specified in ISO 16000-9.

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## Indoor air —

### Part 23:

## Performance test for evaluating the reduction of formaldehyde concentrations by sorptive building materials

### 1 Scope

This part of ISO 16000 specifies a general laboratory test method for evaluating the reduction of formaldehyde and other carbonyl compounds (aldehydes and ketones) concentrations by sorptive building materials. This method applies to boards, wallpapers, carpets, paint products, and other building materials. The sorption of those target compound(s), i.e. formaldehyde and other carbonyl compounds can be brought about by adsorption, absorption and chemisorption. The performance of the material with respect to its ability to reduce the concentration of formaldehyde and other carbonyl compounds in indoor air is evaluated by measuring area specific reduction rate and saturation mass per area. The former directly indicates material performance with respect to formaldehyde and other carbonyl compounds concentration reduction at a point in time; the latter relates to the ability of a product to maintain that performance.

The method specified in this part of ISO 16000 employs formaldehyde and other carbonyl compounds-spiked supply air to determine the performance of building materials in reducing formaldehyde and other carbonyl compounds concentrations.

This part of ISO 16000 is based on the test chamber method specified in ISO 16000-9. Sampling, transport and storage of materials to be tested and preparation of test specimens are specified in ISO 16000-11. Air sampling and analytical methods for the determination of formaldehyde and other carbonyl compounds are specified in ISO 16000-3, which is part of the complete procedure.

This part of ISO 16000 applies to the determination of formaldehyde and other carbonyl compounds, e.g., formaldehyde; acetaldehyde; acetone; benzaldehyde; butyraldehyde; valeraldehyde; 2,5-dimethylbenzaldehyde; capronaldehyde; isovaleraldehyde; propionaldehyde; o-tolualdehyde; m-tolualdehyde; p-tolualdehyde.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 6353-3, *Reagents for chemical analysis — Part 3: Specifications — Second series*

ISO 16000-3, *Indoor air — Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method*

ISO 16000-6, *Indoor air — 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 or MS-FID*

ISO 16000-9:2006, *Indoor air — Part 9: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test chamber method*

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ISO 16000-11, *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*

### 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 <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1 area specific reduction rate

$\rho_{ads}$

mass of target compound(s) sorbed per time per area at the specified elapsed time from the test start

#### 3.2 breakthrough time

$t_b$

<indoor air> time at which the target compound(s) concentration in the air eluting from the sample tube reaches 0,5 % of the concentration in the supplied air

Note 1 to entry: Adapted from ISO 16000-24:2009, 3.2.

#### 3.3 degradation coefficient

<indoor air> ratio of the mass of target compound(s) removed by the initial performance divided by the mass of the same compound lost by deterioration

Note 1 to entry: Adapted from ISO 16000-24:2009, 3.3.

#### 3.4 elapsed time

$t_e$

<indoor air> time from start of test to the start of air sampling

Note 1 to entry: Elapsed time is expressed in hours or days.

#### 3.5 equivalent ventilation rate per area

$F_{V,eq}$

<indoor air> increased clean air ventilation rate giving the same reduction in target compound(s) concentration as the building material

Note 1 to entry: Adapted from ISO 16000-24:2009, 3.5.

#### 3.6 guideline concentration

<indoor air> guideline indoor air concentration for target compound(s) as specified by the WHO or an appropriate national standards body

Note 1 to entry: Adapted from ISO 16000-24:2009, 3.5.

#### 3.7 half-lifetime

<indoor air> time elapsed from the start of the test until the target compound(s) concentration reduction performance decreases to one-half of the initial concentration reduction performance

Note 1 to entry: Adapted from ISO 16000-24:2009, 3.7.