



**SLOVENSKI STANDARD**  
**SIST EN ISO 16000-19:2014**  
**01-december-2014**

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**Notranji zrak - 19. del: Strategija vzorčenja gliv (ISO 16000-19:2012)**

Indoor air - Part 19: Sampling strategy for moulds (ISO 16000-19:2012)

Innenraumluftverunreinigungen - Teil 19: Probenahmestrategie für Schimmelpilze (ISO 16000-19:2012)

Air intérieur - Partie 19: Stratégie d'échantillonnage des moisissures (ISO 16000-19:2012)

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**Ta slovenski standard je istoveten z: EN ISO 16000-19:2014**  
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**ICS:**

13.040.20      Kakovost okoljskega zraka      Ambient atmospheres

**SIST EN ISO 16000-19:2014**                      **en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 16000-19**

October 2014

ICS 13.040.20

English Version

## Indoor air - Part 19: Sampling strategy for moulds (ISO 16000-19:2012)

Air intérieur - Partie 19: Stratégie d'échantillonnage des moisissures (ISO 16000-19:2012)

Innenraumluftverunreinigungen - Teil 19:  
Probenahmestrategie für Schimmelpilze (ISO 16000-19:2012)

This European Standard was approved by CEN on 9 February 2014.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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 CEN-CENELEC Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

The text of ISO 16000-19:2012 has been prepared by Technical Committee ISO/TC 146 "Air quality" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 16000-19:2014 by Technical Committee CEN/TC 264 "Air quality" 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 *April 2015*, and conflicting national standards shall be withdrawn at the latest by *April 2015*.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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

### Endorsement notice

The text of ISO 16000-19:2012 has been approved by CEN as EN ISO 16000-19:2014 without any modification.

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INTERNATIONAL  
STANDARD

ISO  
16000-19

First edition  
2012-06-01

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Indoor air —

Part 19:  
Sampling strategy for moulds

*Air intérieur —*

*Partie 19: Stratégie d'échantillonnage des moisissures*

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Reference number  
ISO 16000-19:2012(E)

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Published in Switzerland



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## ISO 16000-19:2012(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.

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 16000-19 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

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 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
- 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 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 28: Determination of odour emissions from building products using test chambers*

The following parts are under preparation:

- *Part 21: Detection and enumeration of moulds — Sampling from materials*
- *Part 27: Determination of settled fibrous dust on surfaces by SEM (scanning electron microscopy) (direct method)*
- *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 constructions on pollutants and other injurious factors — Inspections*

## Introduction

Mould spores and metabolites can be inhaled via the air and cause allergic and irritating reactions and/or complex symptoms in humans. Moreover, mould growth can be associated with severe odour nuisances. In rare cases, some mould species can cause infections (so-called mycoses) in certain risk groups.<sup>[14][18][19]</sup>

There is sufficient epidemiological evidence that damp and mouldy buildings increase the risk of respiratory symptoms, respiratory infections and enhances asthma symptoms of the occupants.<sup>[8]</sup> In addition, there is some evidence for increased risk of development of allergic rhinitis and asthma. Furthermore, there is clinical evidence for rare symptoms like allergic alveolitis, chronic rhinosinusitis and allergic sinusitis. Toxicological studies *in vivo* and *in vitro* show irritating and toxic reactions of microorganisms (including spores, cell components and metabolites) from damp buildings.<sup>[8]</sup>

Growth of microorganisms in damp buildings can lead to increased concentrations of spores, cell fragments, allergens, mycotoxins, endotoxins,  $\beta$ -glucanes and MVOC (microbial volatile organic compounds). From the studies conducted so far it is not clear which compounds are the causative agents of the health effects observed. Nevertheless, increased concentrations of each of these compounds are considered a potential health risk<sup>[8][18]</sup> and growth of mould in buildings should, therefore, be avoided.

The prime objective of this part of ISO 16000 is to provide assistance in identifying mould sources in indoor environments.

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# Indoor air —

## Part 19: Sampling strategy for moulds

### 1 Scope

This part of ISO 16000 describes the measurement strategy for the detection of fungi in indoor environments.

It describes suitable sampling and analysis methods together with a description of the applicability and the interpretation of the measurement results to maximize the comparability of the measured data obtained for a given measurement objective. It does not include details on recording building characteristics or field inspections by qualified professionals which have to take place prior to any microbiological measurement.

This part of ISO 16000 is not applicable to a detailed description of the building physics- and building-engineering-related procedures applicable to field inspections. The methods and procedures presented do not allow quantitative exposure assessment with regard to the room occupants.

The application of this part of ISO 16000 presupposes the knowledge of ISO 16000-1.

### 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.

ISO 16000-16, *Indoor air — Part 16: Detection and enumeration of moulds — Sampling by filtration*

ISO 16000-18, *Indoor air — Part 18: Detection and enumeration of moulds — Sampling by impaction*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **pre-existing mouldy condition**

desiccated “old” mould growth, where additional biomass growth no longer occurs and the indoor air mould spore concentration gradually decreases with time

#### 3.2

##### **biological preservation efficiency**

capacity of the sampler to maintain the viability of the airborne microorganisms during collection and also to keep the microbial products intact

[SOURCE: EN 13098:2000<sup>[6]</sup>]