AS 16000.1:2025

Australian STANDARD®

STANDARDS Australia

Indoor air

Part 1: General aspects of sampling strategy (ISO 16000-1:2004, MOD)

AS 16000.1:2025

This Australian Standard® was prepared by EV-007, Methods for Examination of Air. It was approved on behalf of the Standards Australia's Standards Development and Accreditation Committee on 23 October 2025.

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The following are represented on Committee EV-007:

ACT Health
Australian Aluminium Council
Australian Institute of Refrigeration Air Conditioning and Heating
Clean Air Society of Australia & New Zealand
Department of Climate Change, Energy, the Environment and Water, NSW
Department of Environment, Tourism, Science and Innovation, QLD
Department of Water and Environmental Regulation, WA
Environment Protection Authority, Vic.
National Association of Testing Authorities, Australia
RMIT University

Additional Interests:

Australian Institute of Occupational Hygienists (AIOH)
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Indoor air

Part 1: General aspects of sampling strategy (ISO 16000-1:2004, MOD)

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How to read this Standard

This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

This Standard is a modified adoption of an International Standard. It makes changes to the international text.

The changes to the international text are shown in boxes in the text. These boxes have the heading "National Variations".

To use this Standard in Australia/New Zealand, the changes in the national variation boxes need to be followed.

Preface

This Standard was prepared by the Standards Australia Committee EV-007, Method for Examination of Air. Standards Australia Sub-committee EV-007-02, Indoor Air, contributed to the preparation of this document.

The objective of this document is to aid the planning of indoor air pollution monitoring.

This document is an adoption with national modifications, and has been reproduced from, ISO 16000-1, *Indoor Air — Part 1: General aspects of sampling strategy*. The modifications are set out in national variations boxes which give instructions where the ISO text is to be modified for use in Australia. Due to ISO copyright policy it is not possible to directly modify the ISO content.

As this document has been reproduced from an International document, the following apply:

(a) In the source text “This part of ISO 16000” should read “this document”.

(b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is for information and guidance only.

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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 16000-1 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

NATIONAL VARIATION

Delete the sixth and seventh paragraphs and *replace* with the following:

ISO 16000 series 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 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 organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, 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 samples of 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 samples of 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 (NO2)

— 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 (and its Corrigendum 1:2011)

NATIONAL VARIATION

— 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 22: Detection and quantification of fungal biomass by fungal β-N-acetylhexosaminidase enzyme activity

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

— Part 24: Performance test for evaluating the reduction of volatile organic compound 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 (CO2)

— 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)

— Part 34: Strategies for the measurement of airborne particles

— Part 35: Determination of total cell count in building material [Under development]

— Part 36: Standard method for assessing the reduction rate of culturable airborne bacteria by air purifiers using a test chamber

— Part 37: Measurement of PM2,5 mass concentration

— 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 - Analysis of amines by (ultra-) high-performance liquid chromatography coupled to high resolution or tandem mass spectrometry

— Part 40: Indoor air quality management system (and its Amendment 1:2024)

— Part 41: Assessment and classification

— Part 42: Measurement of the particle number concentration by condensation particle counters

— Part 43: Standard method for assessing the reduction rate of culturable airborne fungi by air purifiers using a test chamber

— Part 44: Test method for measuring perceived indoor air quality for use in testing the performance of gas phase air cleaners

NOTE This is not an exhaustive list of the ISO 16000 series, please refer to the ISO website for newer or revised ISO 16000 series (and all parts).

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 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 9: Determination of the emission of volatile organic compounds — Emission test chamber method*

— *Part 10: Determination of the emission of volatile organic compounds — Emission test cell method*

— *Part 11: Determination of the emission of volatile organic compounds — Sampling, storage of samples and preparation of test specimens*

The following parts are under preparation:

— *Part 5: Sampling strategy for volatile organic compounds (VOCs)*

— *Part 7: Sampling strategy for determination of airborne asbestos fibre concentrations*

— *Part 8: Ventilation rate measurement*

Introduction

The ISO 16000 series deals with indoor air measurements. This part of ISO 16000 is intended as an aid to planning indoor air pollution measurements. Additional parts of ISO 16000 describe the sampling strategy, including the conditions to be observed for the particular substances or groups of substances, such as the dependence of indoor air pollution concentrations on atmospheric humidity or temperature or other effects. The actual procedures dealing with indoor air measurements for the individual substances are also presented in other parts of ISO 16000.

NATIONAL VARIATION

In the paragraph below, *delete* "extend" and *replace* with "extent".

An inappropriate monitoring strategy can contribute to the overall uncertainty of the measurement result to a greater extend than the monitoring procedure itself.

NATIONAL VARIATION

In the paragraph below, *delete* "sensoric" and *replace* with "sensory".

Attention should be given to the special role of the human sense of smell in identifying substances or classes of substances in indoor air. Here it is not so much the sensitivity of the sense of smell, but the memory of smell and the experience of the specialist (chemist, perfume specialist) that is important. Sensory information can greatly simplify the identification of air pollutants and consequently influence the sampling strategy. However, sensoric adaptation affects the sensory information, particularly in the case of persistent indoor pollutants.

The interpretation of indoor air measurements is assisted by the use of guideline values for acceptable indoor air quality. To draw a conclusion about whether and to what extent the concentrations of a pollutant measured in a room exceed the normal level or the level acceptable from the standpoint of health, it is useful to rely on guideline values or published literature. The column "Remarks" of Table C.1 (see Annex C) gives available World Health Organization (WHO) air quality guidelines for indoor air[1]. It is emphasized, however, that these values are not legally binding. In the absence of published guideline values, the investigator may consult peer reviewed journal articles or other literature for guidance on typical values observed in buildings without reported complaints.

Representatives of various technical fields should be involved in the planning of indoor air quality measurements.

Table A.1 of this part of ISO 16000 summarizes the most important types of indoor environment, and examples of the sources that may be encountered in them. The list is not, of course, fully comprehensive because of the large number of possibilities.

NATIONAL VARIATION

Delete the paragraph below and *replace* with the following:

Table B.1 shows the sources of indoor air pollutants and the most important substances emitted. Table C.1 lists substances frequently detected and their possible sources. In some cases, the sources of indoor pollution arise outside the building; for example, bush fire emissions, benzene or tyre wear particles from vehicle traffic and/or petrol stations, and chlorinated hydrocarbons from nearby dry-cleaning establishments. Soil emissions may also be important if, for example, buildings have been erected on old landfills, industrial sites, or uranium-containing soils which emit radon.

Table B.1 shows the sources of indoor air pollutants and the most important substances emitted. Table C.1 lists substances frequently detected and their possible sources. In some cases, the sources of indoor pollution arise outside the building; for example, benzene from vehicle traffic and petrol stations, and chlorinated hydrocarbons from nearby dry-cleaning establishments. Soil emissions may also be important

if, for example, buildings have been erected on old landfills, industrial sites, or uranium-containing soils which emit radon.

Annex D contains a checklist relating to information to be recorded when indoor air measurements are carried out. This list is also intended to aid the user of this part of ISO 16000 in the subsequent assessment of the analytical result.

The sampling strategy procedure described in this part of ISO 16000 is based on Guideline VDI 4300 Part 1[2]. Similar national standards exist[3],[4],[5].

Australian Standard®

Indoor air

Part 1: General aspects of sampling strategy (ISO 16000-1:2004, MOD)

1 Scope

This part of ISO 16000 is intended to aid the planning of indoor pollution monitoring.

Before a sampling strategy is devised for indoor air monitoring, it is necessary to clarify for what purposes, when, where, how often and over what periods of time monitoring is to be performed. The answers to these questions depend, in particular, on a number of special characteristics of the indoor environments, on the objective of the measurement and, finally, on the environment to be measured. This part of ISO 16000 deals with the significance of these factors and offers suggestions on how to develop a suitable sampling strategy.

This part of ISO 16000 is applicable to indoor environments such as dwellings with living rooms, bedrooms, do-it-yourself rooms, recreation rooms and cellars, kitchens and bathrooms; workrooms or work places in buildings which are not subject to health and safety inspections in regard to air pollutants (for example, offices, sales premises); public buildings (for example hospitals, schools, kindergartens, sports halls, libraries, restaurants and bars, theatres, cinemas and other function rooms), and also cabins of vehicles[6].

NATIONAL VARIATION

Delete Note and *replace* with the following:

NOTE In some countries, including Australia, workplaces such as offices and sales premises are subject to workplace health and safety state and territory legislation.

NOTE In some countries, workplaces such as offices and sales premises are subject to health and safety inspections with regard to air pollutants.

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/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

NATIONAL VARIATION

Delete "*Guide to the expression of uncertainty in measurement* (GUM), BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML, 1995" below and *replace* with the following:

JCGM 100, *Evaluation of measurement data – Guide to the expression of uncertainty in measurement*

JCGM 101, *Evaluation of measurement data – Supplement 1 to the "Guide to the expression of uncertainty in measurement" – Propagation of distributions using a Monte Carlo method*

JCGM 102, *Evaluation of measurement data – Supplement 2 to the "Guide to the expression of uncertainty in measurement" – Extension to any number of output quantities*