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**Indoor air —**

**Part 34:  
Strategies for the measurement of  
airborne particles**

*Air intérieur —*

*Partie 34: Stratégie pour la mesure des particules en suspension*



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Published in Switzerland

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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 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

A list of all parts in the ISO 16000 series can be found on the ISO 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](http://www.iso.org/members.html).

## Introduction

Airborne particulate matter (colloquially known as “fine dust”) plays a role not only outdoors, but is also significant in terms of hygiene, especially indoors. People in industrialized countries spend most of the day indoors. Particles are either transported into indoor air from outdoor environments or the particles directly result from indoor sources, such as smoking, housework and do-it-yourself (DIY), burning candles, residential wood burning, cooking and using printers. The concentration, composition and size distribution of airborne particulate matter in indoor environments strongly depend on parameters such as the sources present in the room, room size, relative humidity, air exchange rate, air flow conditions and sink effects on surfaces (e.g. walls, ceilings, floor coverings, soft furnishings). In addition, particles already deposited can be re-entrained through various activities and subsequently inhaled. Depending on the particular case, all this can result in highly variable levels of indoor fine dust pollution that are not easily ascertained or assessed in terms of their impact on health.

In the ISO 16000 series, the following rooms are understood to constitute indoor spaces: dwellings with living rooms, bedrooms, work rooms, sport rooms, cellars, kitchens and bathrooms; work spaces or workstations in buildings not subject to controls under industrial safety legislation in terms of airborne pollution (e.g. offices, shops); public buildings (e.g. restaurants, theatres, cinemas, other function rooms); and the passenger compartments of vehicles and all public transport systems (e.g. buses, trains, aircraft).

Epidemiological and toxicological findings suggest that health effects are more strongly related to sub-micron particles<sup>[33]</sup>. Indeed, ultrafine particles (UFP), due to their small size, can deeply penetrate into the body and contribute to adverse health effects.

This document describes the general strategies for the measurement of airborne particles, including PM<sub>10</sub>, PM<sub>2,5</sub>, PM<sub>1</sub> and UFP. The different technologies available equipment are presented and compared in a way that allows the user to select the best technique depending on the monitoring objective. Sampling requirements are presented together with key factors that users should take into account.

# Indoor air —

## Part 34:

# Strategies for the measurement of airborne particles

## 1 Scope

This document specifies the general strategies for determining the concentration of airborne particles indoors and covers the size range from approximately 1 nm to 100 µm.

In addition, this document describes methods for identifying typical indoor particle sources and gives general recommendations for obtaining a representative sample.

The main sources of indoor particulate matter are described in this document, together with indoor particle dynamics. Various measurement methods are described, along with their advantages, disadvantages and areas of application, as well as some general sampling recommendations. Measurement strategies for determining airborne particles indoors are discussed, including reference case studies with more specific sampling recommendations.

Additional documents in the ISO 16000 series will focus on each fraction of airborne particulate matter and give specific recommendations for these measurements.

The determination of measurement uncertainty and minimum reporting requirements are also part of this document.

This document does not apply to the determination of bioaerosols or the chemical characterization of particles. For the measurement and assessment of dust composition, see the relevant part in the ISO 16000 series.

This document does not apply to the measurement of airborne particles in vehicle passenger compartments and public transport systems.

## 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 16000-1:2004, *Indoor air — Part 1: General aspects of sampling strategy*

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