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Indoor air —

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

Air intérieur —

Partie 42: Mesurage de la concentration en nombre de particules au moyen de compteurs de particules à condensation

Reference number
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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 document 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).

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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.

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Introduction

People spend most of their day indoors where they are exposed to various sources of particles. Such particles can be dust particles, particles from combustion processes such as candles, cooking and fireplaces. Particles can also be emitted by do-it-yourself activities and the operation of electrical equipment such as printers. Classical building envelope materials are not efficient to prevent particle transport between indoor and outdoor environments. Sources of outdoor particles are various and include traffic and other combustion processes, and industrial and agricultural activities. Air exchanges are driven by natural infiltration and ventilation, but also mechanical ventilation present in the building.

All this can result in highly variable levels of indoor particles concentration that are not easily ascertained or assessed in terms of their impacts on health.

Epidemiological studies have shown that ultrafine particles (UFP) can have a negative impact on peoples' health.[1] Due to their very small size they can indeed penetrate deeply into the human body.

Particle measurement instrumentation allows determining either the total particle number concentration or the particle number size distribution. This document describes the general strategies for the measurement of indoor sub-micron particles with the focus on determining the total number concentration.

This document was prepared in response to the need for improved comparability of methods for particle measurement.

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Indoor air —

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

1 Scope

This document specifies the measurement methods and strategies for determining the total number of airborne particles per unit volume of air indoor, using a condensation particle counter (CPC) for particles approximately between 10 nm to 3 µm.

NOTE As the particle number concentration is usually dominated by the ultrafine particle (UFP) fraction, the obtained result can be used as an approximation of the UFP concentration.

Quality assurance, determination of the measurement uncertainty and minimal reporting information are also discussed in this document.

This document is applicable to indoor environments as specified in ISO 16000-1.

This document does not address the determination of bioaerosols or the chemical characterization of particles. Nevertheless, some bioaerosols can be detected by the CPC and then contribute to the measured count of particles.

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, *Indoor air — Part 1: General aspects of sampling strategy*

ISO 16000-34, *Indoor air — Part 34: Strategies for the measurement of airborne particles*

ISO 27891, *Aerosol particle number concentration — Calibration of condensation particle counters*

CEN/TS 16976, *Ambient air — Determination of the particle number concentration of atmospheric aerosol*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
aerosol
multi-phase system of solid and/or liquid *particles* (3.2) suspended in a gas, ranging in particle size from 0,001 µm to 100 µm

[SOURCE: CEN/TS 16976:2016, 3.2]

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