Irish Standard
I.S. EN ISO 28439:2011

Workplace atmospheres - Characterization of ultrafine aerosols/nanoaerosols - Determination of the size distribution and number concentration using differential electrical mobility analysing systems (ISO 28439:2011)

I.S. EN ISO 28439:2011

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Workplace atmospheres - Characterization of ultrafine aerosols/nanoaerosols - Determination of the size distribution and number concentration using differential electrical mobility analysing systems (ISO 28439:2011)

Air des lieux de travail - Caractérisation des aérosols ultrafins/nanoaérosols - Détermination de la distribution granulométrique et de la concentration en nombre à l'aide de systèmes d'analyse différentielle de mobilité électrique (ISO 28439:2011)

Arbeitsplatzatmosphäre - Charakterisierung ultrafeiner Aerosole/Nanoaerosole - Bestimmung der Größenverteilung und Anzahlkonzentration mit differentiellen elektrischen Mobilitätsanalysesystemen (ISO 28439:2011)

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Foreword

This document (EN ISO 28439:2011) has been prepared by Technical Committee CEN/TC 137 “Assessment of workplace exposure to chemical and biological agents”, the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 146 "Air quality".

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of an identical text or by endorsement, at the latest by October 2011, and conflicting national standards shall be withdrawn at the latest by October 2011.

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INTERNATIONAL STANDARD

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Workplace atmospheres — Characterization of ultrafine aerosols/ nanoaerosols — Determination of the size distribution and number concentration using differential electrical mobility analysing systems

Air des lieux de travail — Caractérisation des aérosols ultrafins/ nanoaérosols — Détermination de la distribution granulométrique et de la concentration en nombre à l'aide de systèmes d'analyse différentielle de mobilité électrique

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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.

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Introduction

Within occupational hygiene, aerosol concentrations have been traditionally measured in terms of mass concentrations. For some ultrafine aerosols and nanoaerosols, other exposure metrics such as the number and surface area concentration are likely to become important for predicting health effects, depending on chemical and physical properties. This International Standard provides a method for determining the number concentration and size distribution of ultrafine aerosols and nanoaerosols at workplaces by using differential mobility analysing systems (DMASs). This can be used by occupational hygienists and researchers to measure the concentration at some workplaces. The system is generally not suitable for personal exposure measurements.

Workplace atmospheres — Characterization of ultrafine aerosols/nanoaerosols — Determination of the size distribution and number concentration using differential electrical mobility analysing systems

1 Scope

This International Standard provides guidelines for the determination of the number concentration and size distribution of ultrafine aerosols and nanoaerosols by use of mobility particle sizers (also called differential mobility analysers). Only the particle fraction of the aerosol is considered. For ultrafine aerosols and nanoaerosols, exposure metrics such as the number and surface area concentration are important.

This International Standard also gives guidelines for the determination of workplace exposure to ultrafine aerosols and nanoaerosols.

Specifically, the differential mobility analysing system (DMAS), now available from several vendors, is discussed. Principles of operation, problems of sampling in the workplace environment, calibration, equipment maintenance, measurement uncertainty, and reporting of measurement results are covered.

Potential problems and limitations are described, which need to be addressed when limit values are fixed and compliance measurements carried out.

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/TR 27628, *Workplace atmospheres — Ultrafine, nanoparticle and nano-structured aerosols — Inhalation exposure characterization and assessment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 27628 and the following apply.

3.1
critical electrical mobility
Z_{crit}
electrical mobility of particles that in the differential electrical mobility classifier are transferred from the sample air flow to the exiting monodisperse aerosol flow

NOTE Due to the finiteness of the DEMC, the exiting monodisperse flow is not strictly monodisperse, but corresponds to a range of electrical mobilities for each voltage.