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Ambient air - Determination of the particle number size distribution of atmospheric aerosol using a Mobility Particle Size Spectrometer (MPSS)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/20

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English Version

**Ambient air - Determination of the particle number size
distribution of atmospheric aerosol using a Mobility
Particle Size Spectrometer (MPSS)**

Air ambient - Détermination de la distribution
granulométrique de particules d'un aérosol
atmosphérique à l'aide d'un spectromètre de
granulométrie à mobilité électrique (MPSS)

Außenluft - Bestimmung der
Partikelanzahlgrößenverteilung des atmosphärischen
Aerosols mit einem Mobilitäts-
Partikelgrößenspektrometer (MPSS)

This Technical Specification (CEN/TS) was approved by CEN on 22 December 2019 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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European foreword

This document (CEN/TS 17434:2020) has been prepared by Technical Committee CEN/TC 264 “Air quality”, the secretariat of which is held by DIN.

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CEN/TS 17434:2020 (E)**Introduction**

There is a growing awareness of the significance of aerosol particles with diameters of $D < 1 \mu\text{m}$ for human health as well as for their climatic impact. To assess air quality, it appears necessary to supplement gravimetrically determined mass concentrations such as PM_{10} or $\text{PM}_{2.5}$ with a measurement of the particle number concentration. Since ultrafine particles with diameters of $D < 0,1 \mu\text{m}$ make an almost insignificant contribution to the mass concentration of atmospheric aerosol particles, they can best be detected with counting measuring methods of sufficient sensitivity.

As particle measurement instrumentation allows determining either the particle number concentration or the particle number size distribution two Technical Specifications have been established:

- one dealing with the determination of the single parameter number concentration (a measure of “total” number concentration (CEN/TS 16976)),
- one dealing with the determination of number concentrations within a limited number of size ranges (this document).

Clauses 5 and 6 contain general information about the method and the expected properties of the aerosol particles to be measured.

Clause 7 sets out the performance criteria for MPSSs. Specifically, these are the relevant performance characteristics of MPSS instruments (without any sampling system), the respective criteria that shall be met, and a description of how the tests shall be carried out. In general these tests are expected to be carried out by test houses or MPSS manufacturers rather than users, and could form the basis for type approval of MPSSs in future.

Clause 8 sets out the performance criteria and test procedures for the sampling and conditioning system. These may be applied by manufacturers of sampling systems, test houses or users (network operators).

Clause 9 sets out requirements for the installation, initial checks and calibrations, and operation of an MPSS and sampling system at a monitoring site, including routine maintenance, data processing (including use of QA/QC data) and reporting. In general these will be the responsibility of users (network operators), though calibrations requiring test aerosols shall only be carried out by suitably qualified laboratories.

Clause 10 sets out Quality Assurance and Quality Control procedures, i.e. the ongoing checks and calibrations that are required on the MPSS and sampling system during operation at a monitoring site. It is expected that these will be the responsibility of users (network operators). The main sources of measurement uncertainty are described, but it is not possible in this document to quantify the overall measurement uncertainty for data reported following the method.

1 Scope

This document describes a standard method for determining particle number size distributions in ambient air in the size range from 10 nm to 800 nm at total concentrations up to approximately 10^5 cm^{-3} with a time resolution of a few minutes. The standard method is based on a Mobility Particle Size Spectrometer (MPSS) used with a bipolar diffusion charger and a Condensation Particle Counter (CPC) as the detector. The document describes the performance characteristics and minimum requirements of the instruments and equipment to be used, and describes sampling, operation, data processing and QA/QC procedures, including calibration.

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.

CEN/TS 16976:2016, *Ambient air — Determination of the particle number concentration of atmospheric aerosol*

ISO 15900, *Determination of particle size distribution — Differential electrical mobility analysis for aerosol particles*

ISO 27891:2015, *Aerosol particle number concentration — Calibration of condensation particle counters*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN