

Ambient air - Automated measuring systems for the measurement of the concentration of particulate matter (PM10; PM2,5)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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English Version

**Ambient air - Automated measuring systems for the  
measurement of the concentration of particulate matter  
(PM<sub>10</sub>; PM<sub>2,5</sub>)**

Air ambiant - Systèmes automatisés de mesurage de la  
concentration de matière particulaire (PM<sub>10</sub>; PM<sub>2,5</sub>)

Außenluft - Automatische Messeinrichtungen zur  
Bestimmung der Staubkonzentration (PM<sub>10</sub>; PM<sub>2,5</sub>)

This European Standard was approved by CEN on 16 January 2017.

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

European foreword.....	3
1 Scope.....	4
2 Normative references.....	5
3 Terms and definitions .....	5
4 Symbols and abbreviated terms .....	9
5 Principle .....	10
6 Sampling.....	12
7 Type testing.....	13
8 Field operation and ongoing quality control .....	29
9 Data handling, validation and data reports.....	38
10 Reporting of AMS data .....	39
11 Test reports and documentation – Field operation.....	39
Annex A (informative) Examples of principles of AMS for monitoring particulate matter.....	40
A.1 Oscillating microbalance .....	40
A.2 $\beta$ -ray attenuation .....	41
A.3 Light scattering .....	42
A.4 System consisting of a central instrument and an array of regional instruments .....	42
Annex B (normative) Orthogonal regression algorithms.....	43
Annex C (normative) Performing calibrations of the AMS.....	45
Annex D (normative) Elements of type testing report.....	47
Annex E (informative) Elements of suitability evaluation report .....	49
Bibliography.....	50

## European foreword

This document (EN 16450:2017) has been prepared by Technical Committee CEN/TC 264 “Air quality”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 16450:2013.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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## 1 Scope

In order to be in compliance with EU Air Quality Directive requirements, the reference methods given in the Directive 2008/50/EC [1] for the measurement of mass concentrations of particulate matter are not commonly used for operation in routine monitoring networks. These networks usually apply automated continuous measurement systems (AMS), such as those based on the use of oscillating microbalances,  $\beta$ -ray attenuation, or *in situ* optical methods. Such AMS are typically capable of producing 24-h average measurement values over a measurement range up to 1 000  $\mu\text{g}/\text{m}^3$  and 1-h average measurement values up to 10 000  $\mu\text{g}/\text{m}^3$ , if applicable, where the volume of air is the volume at ambient conditions near the inlet.

The 1-h average values may be used for:

- a) direct information of the public;
- b) aggregation to produce daily or yearly average concentration values for regulatory reporting purposes.

NOTE National regulatory reporting purposes could require other time basis for averages (i.e. monthly).

Directive 2008/50/EC allows the use of such systems after demonstration of equivalence with the reference method, i.e. after demonstration that these systems meet the Data Quality Objectives for continuous measurements. Guidelines for the demonstration of equivalence are given in Reference [2].

This European Standard lays down the minimum performance requirements and test procedures for the type testing of appropriate AMS for particulate matter. The standard includes the evaluation of its equivalence with the reference method as laid down in Directive 2008/50/EC.

Further, this European Standard describes minimum requirements for ongoing quality assurance – quality control (QA/QC) of AMS deployed in the field. These requirements are necessary to ensure that uncertainties of measured concentrations are kept within the required limits during extended periods of continuous monitoring in the field, and include procedures for maintenance, calibration and control checks.

Additional procedures are described that determine whether an instrument's equivalence to the reference method is maintained through possible pollution climate changes, over periods longer than five years.

Lastly, this European Standard describes harmonized requirements and procedures for the treatment and validation of raw measurement data that are used for the assembly of daily or yearly average concentration values. Experience with existing methods for data treatment and validation – for similar AMS – has shown that the different ways of data treatment and validation applied may lead to significant differences in reported results for similar data sets [3].

When the European Standard is used for purposes other than measurements required by Directive 2008/50/EC, the range and uncertainty requirements may not apply.

This European Standard contains information for different groups of users.

Clauses 5 and 6 and Annex A contain general information about the principles of automated continuous measurement systems for particulate matter, and relevant equipment.

Clause 7 and Annexes B and C are specifically directed towards test houses and laboratories that perform type testing of automated continuous measurement systems for particulate matter. These clauses contain information about:

- c) type testing conditions, test procedures and test requirements;
- d) system performance requirements;
- e) evaluation of the type testing results;
- f) evaluation of the uncertainty of the measurement results of the automated continuous measurement systems for particulate matter based on the type testing results.

Clauses 8 to 11 are aimed at monitoring networks performing the practical measurements of particulate matter in ambient air. These clauses contain information about:

- g) initial installation of the system in the monitoring network and acceptance testing;
- h) ongoing quality assurance/quality control;
- i) on-going verification of suitability;
- j) treatment, validation and reporting of measurement results.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12341, *Ambient air - Standard gravimetric measurement method for the determination of the PM<sub>10</sub> or PM<sub>2,5</sub> mass concentration of suspended particulate matter*

## 3 Terms and definitions

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

### 3.1

#### **ambient air**

outdoor air in the troposphere, excluding workplaces as defined by Directive 89/654/EEC [4] where provisions concerning health and safety at work apply and to which members of the public do not have regular access

[SOURCE: Directive 2008/50/EC [1]]

### 3.2

#### **automated measuring system**

##### **AMS**

entirety of all measuring instruments and additional devices necessary for obtaining a measurement result

### 3.3

#### **availability of the AMS**

fraction of the time period for which valid measuring data of the ambient air concentration is available from an AMS

[SOURCE: EN 14211 [5]]