ISO 16000-34:2018 (E)

Indoor air — Part 34: Strategies for the measurement of airborne particles

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Origin, properties and health implications of airborne particles

4.1 Origin and properties
4.2 Health implications

5 Sources of indoor particulate matter and particle dynamics indoors

5.1 General
5.2 Sources of indoor particulate matter
5.2.1 Typical indoor sources
5.2.2 Influence of the premises
5.2.3 Particle size range generated by typical sources
5.3 Particle dynamics indoors
5.3.1 Major particle sinks
5.3.2 Variations of the particle spectrum
5.3.3 Effect of air conditioning
5.3.4 Conditions of room use

6 Measurement methods for airborne particles indoors

6.1 General
6.2 Established method description
6.2.1 General
6.2.2 Cyclone
6.2.2.1 Principle
6.2.2.2 Capabilities of the method
6.2.2.3 Limits of the method
6.2.3 Impactors (impactor – cascade impactor – LPI – MOI)
6.2.3.1 Principle
6.2.3.2 Capabilities of the method
6.2.3.3 Limits of the method
6.2.4 Differential mobility analyser (DMA)
6.2.4.1 Principle
6.2.4.2 Capabilities of the method
6.2.4.3 Limits of the method
6.2.5 Aerosol mass spectrometer (AMS)
6.2.5.1 Principle
6.2.5.2 Capabilities of the method
6.2.5.3 Limits of the method
6.2.6 Aerosol mass monitor (AMM)
6.2.6.1 Principle
6.2.6.2 Capabilities of the method
6.2.6.3 Limits of the method
6.2.7 Oscillating microbalance (OMB)
6.2.7.1 Principle
6.2.7.2 Capabilities of the method
6.2.7.3 Limits of the method
6.2.8 Beta radiation attenuation (BRA) monitor

6.2.8.1 Principle
6.2.8.2 Capabilities of the method
6.2.8.3 Limits of the method
6.2.9 Microscopy (OM – SEM – TEM)
6.2.9.1 Principle
6.2.9.2 Capabilities of the method
6.2.9.3 Limits of the method
6.2.10 Light scattering aerosol spectrometer (LSAS)
6.2.10.1 Principle
6.2.10.2 Capabilities of the method
6.2.10.3 Limits of the method
6.2.11 Time-of-flight spectrometer (TOF-AS)
6.2.11.1 Principle
6.2.11.2 Capabilities of the method
6.2.11.2.1 Limits of the method
6.2.12 Condensation particle counter (CPC – UF CPC – CPC with SES – CPC photometric mode)
6.2.12.1 Principle
6.2.12.2 Capabilities of the method
6.2.12.3 Limits of the method
6.2.13 Faraday cup aerosol electrometer (FCAE)
6.2.13.1 Principle
6.2.13.2 Capabilities of the method
6.2.13.3 Limits of the method
6.2.14 Fast response aerosol spectrometer (FRAS)
6.2.14.1 Principle
6.2.14.2 Capabilities of the method
6.2.14.3 Limits of the method
6.2.15 Low pressure impactor with electric detection (LPI+E)
6.2.15.1 Principle
6.2.15.2 Capabilities of the method
6.2.15.3 Limits of the method

7 General sampling recommendations

7.1 Instrumentation and sampling system
7.2 Measurement location
7.3 Measurement time and duration
7.4 Estimated concentration scale (minimum and maximum accuracy)
7.5 Background concentration
7.6 Impact of outdoor air quality
7.7 Impact of room conditions
7.8 Impact of the measurement itself

8 Measurement strategy for determining airborne particles indoors

8.1 General
8.2 Preliminary work — Definition of the measurement objective and list of basic information
8.2.1 General
8.2.2 Statement on the purpose of the measurement
8.2.3 List of main expected sources
8.2.4 Temporal effects
8.2.5 Description of the indoor compartment
8.3 Visual room inspection — Definition of the measurement planning and strategy
8.4 Preliminary measurements
8.5 Measurement procedures
8.5.1 General
8.5.2 Procedure for the determination of the background
8.5.2.1 Instrumentation and measurands
8.5.2.2 Measurement procedure
8.5.2.3 Measurement planning and setup
8.5.2.4 Evaluation
8.5.3 Procedure for the estimation of the influence of outdoor (ambient air) concentration
8.5.3.1 Instrumentation and measurands
8.5.3.2 Measurement procedure

8.5.3.3 Measurement planning and setup
8.5.3.4 Evaluation
8.5.4 Procedure for the identification of main sources present in a room
8.5.4.1 General
8.5.4.2 Instrumentation and measurands
8.5.4.3 Measurement procedure
8.5.4.4 Measurement planning and setup
8.5.4.5 Evaluation
8.5.5 Procedure for the measurement of the average and the time-resolved emission of a specific source
8.5.5.1 General
8.5.5.2 Instrumentation and measurands
8.5.5.3 Measurement procedure
8.5.5.4 Measurement planning and setup
8.5.5.5 Evaluation
8.5.6 Procedure for the estimation of the efficiency of an abatement techniques (i.e. filtration by air conditioning system
8.5.6.1 General
8.5.6.2 Instrumentation and measurands
8.5.6.3 Measurement procedure
8.5.6.4 Measurement planning and setup
8.5.6.5 Evaluation

9 Uncertainty evaluation

10 Evaluation and reporting of results

11 Documentation

12 Quality assurance

12.1 Performance specifications
12.2 Quality assurance when determining particle number concentrations
12.2.1 General
12.2.2 Sampling volume flow
12.2.3 Checking the equipment's parameters
12.3 Quality assurance when determining particle mass concentrations
12.3.1 Mass concentration calculation based on measured number concentration
12.3.2 Gravimetric mass concentration measurement
12.3.2.1 General
12.3.2.2 Flow control system
12.3.2.3 Weighing system

Annex A (normative) Protocol for the measurement of indoor airborne particles

Page count: 47