

Australian/New Zealand Standard™

Methods for sampling and analysis of ambient air

Method 9.12: Determination of suspended particulate matter—PM_{2.5} beta attenuation monitors

AS/NZS 3580.9.12:2013

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV-007, Methods for Examination of Air, as a Joint Australian/New Zealand Standard.

The objective of this Standard is to provide regulatory and testing bodies with a method for continuously monitoring suspended matter with an equivalent aerodynamic diameter (EAD) of less than 2.5 µm in ambient air, providing near real-time measurement of mean particle concentration. This is one in a series of Standards for the determination of particulate matter in ambient air.

In the preparation of this Standard, reference was made to ISO 10473:2000, *Ambient air—Measurement of the mass of particulate matter on a filter medium—Beta-ray absorption method*, but this was not adopted as some commonly used instruments fall outside its scope.

The requirements for instruments specified in this Standard were derived from those given in the United States Environmental Protection Agency (US EPA) Code of Federal Regulations, Title 40, Part 53 (40 CFR 53), ‘Ambient air monitoring reference and equivalent methods’, Subpart B, ‘Procedures for testing performance characteristics of automated methods’. Acknowledgment is made of the assistance obtained therefrom.

Instruments bearing the US EPA equivalency designation predominate in Australia and New Zealand. Accordingly it was deemed appropriate to accept the US EPA designation of instruments with minor modifications for local requirements where necessary. The US EPA definitions for performance characteristics vary considerably in presentation (if not in substance) from those currently prescribed in ISO 9169:2006, *Air quality—Definition and determination of performance characteristics of an automatic measuring system*, but have nevertheless been retained, virtually intact, for the sake of preserving consistency with US EPA.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

METHOD

1 SCOPE

This Standard sets out the method for the determination of suspended particulate matter in ambient air using a beta attenuation monitor (BAM). This method can provide a measure of the time-integrated mean particle concentrations for periods ranging from 10 min to 24 h. Measurements made in accordance with this method, when averaged over a 24-hour period, are considered to be equivalent to those determined in accordance with the US EPA *Code of Federal Regulations* Title 40, Protection Environment Part 50 (40 CFA 50) Appendix L and Title 40 Part 53 (40CFA 53) Subpart E.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS ISO/IEC

17025 General requirements for competence of testing and calibration laboratories

AS/NZS

3580 Methods for sampling and analysis of ambient air

3580.1.1 Part 1.1: Guide to siting air monitoring equipment

ISO/IEC

Guide 98-3: Uncertainty of measurement—Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)

EN

14907 Air quality—Standard gravimetric measurement method for the determination of the PM_{2.5} mass fraction of suspended particulate matter

US EPA

40 CFR 50 Code of Federal Regulations, Title 40, Protection of Environment, Part 50 National Primary and Secondary Ambient Air Quality Standards Appendix L: Reference Method for the Determination of Fine Particulate Matter as PM_{2.5} in the Atmosphere

40 CFR 53 Code of Federal Regulations, Title 40, Protection of Environment, Part 53, Ambient Air Monitoring Reference and Equivalent Methods Subpart E: Procedures for Testing Physical (Design) and Performance Characteristics of Reference Methods and Class I and Class II Equivalent Methods for PM_{2.5} or PM_{10-2.5} Subpart D: Procedures for Testing Performance Characteristics of Methods for PM₁₀

Environment Protection and Heritage Council, Peer Review Committee (PRC)

National Environment Protection (Ambient Air Quality) Measure, Technical Paper No. 5, Data Collection and Handling, 2001.

3 DEFINITIONS

For the purpose of this Standard the definitions below apply.

3.1 Areic

Modifier used to denote an attribute divided by area.

3.2 Beta ray

Radiation emitted by electrons during the nuclear decay of radioactive elements. Monitors used in compliance with this method typically use an element such as ¹⁴C.