

Australian/New Zealand Standard™

Methods for sampling and analysis of ambient air

Method 9.10: Determination of suspended particulate matter—PM_{2.5} low volume sampler—Gravimetric method

AS/NZS 3580.9.10:2006

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV-007, Methods for Examination of Air as an Australian/New Zealand Standard. The Standard method deals with the determination of suspended particulate matter with an equivalent aerodynamic diameter (EAD) of less than approximately 2.5 µm (PM_{2.5}). This is one in a series of Standards for the determination of particulate matter in ambient air.

The objective of this Standard is to provide regulatory and testing bodies with a standard method for determining suspended particulate matter with an equivalent aerodynamic diameter of less than 2.5 µm utilizing a low volume sampler and size selective inlet.

AS 2922, *Ambient air—Guide for the siting of sampling units*, is referenced frequently in this Standard. AS 2922 is currently being revised by the Committee and will be renumbered and published as AS/NZS 3580.1.1. When this occurs this Standard will be amended.

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.

FOREWORD

Suspended particulate matter measured by this method includes particles with an equivalent aerodynamic diameter (EAD) of less than 2.5 µm, as passed by a size selective inlet (PM_{2.5}). PM_{2.5} has been statistically associated with certain human health end points, including daily mortality, hospital admissions and exacerbation of asthma. PM_{2.5} emission sources include industrial processes, fuel combustion, burning of vegetation, incineration and natural causes such as wind blown dust and salt laden air. Combustion processes tend to contribute more PM_{2.5} than non-combustion sources. Important anthropogenic sources include domestic wood heaters and motor vehicles (especially diesel fuelled vehicles).

METHOD

1 SCOPE

This Standard sets out the gravimetric determination of $PM_{2.5}$ in ambient air utilizing low volume sequential and non-sequential samplers equipped with size selective inlets. The method provides a measure of mean concentration of $PM_{2.5}$ in units of micrograms per cubic metre ($\mu\text{g}/\text{m}^3$), normally sampled over a 24 h period. This method may be used to collect particle samples for subsequent physical or chemical analysis.

NOTE: Sampling is normally of 24 h duration to average out diurnal variations. Provided that the mass of the filter is determined under carefully controlled laboratory conditions, mean concentrations of $5 \mu\text{g}/\text{m}^3$ (3 L/min sample flow rate) or $1 \mu\text{g}/\text{m}^3$ (16.7 L/min sample flow rate) and greater may be determined, based on a 24 h sampling period.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

2922* Ambient air—Guide for the siting of sampling units

AS ISO/IEC

17025 General requirements for the competence of testing and calibration laboratories

AS/NZS

3760 In-service safety inspection and testing of electrical equipment

ISO

Guide to the expression of uncertainty in measurement (ISO GUM)

EN

12341 Air quality. Determination of the PM_{10} fraction of suspended particulate matter. Reference method and field test procedure to demonstrate reference equivalence of measurement methods

US EPA

US Code of Federal Regulations—Environmental Protection Agency Vol 62, No. 138, July 18, 1997 & Vol 64, No.77, April 22, 1999, 40 CFR, Part 50, Appendix L

NATA

Technical Note 8—In-situ calibration of barometers

Technical Note 13—Users check of balance calibration

Technical Note 19—Liquid-in-glass thermometers—Selection, use and calibration checks

3 DEFINITIONS

For the purpose of this Standard the following definitions apply:

3.1 Equivalent aerodynamic diameter (EAD)

The diameter of a spherical particle of unit density ($1 \text{ g}/\text{cm}^3$) which exhibits the same aerodynamic behaviour as the particle in question.

* AS 2922 is being revised. It is proposed to be re-numbered as AS 3580.1.1.