Australian/New Zealand Standard™

Methods for sampling and analysis of ambient air

Method 9.6: Determination of suspended particulate matter—PM_{10} high volume sampler with size selective inlet—Gravimetric method

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV-007, Methods for Examination of Air, to supersede AS/NZS 3580.9.6:2003. This standard method deals with the determination of suspended matter with an equivalent aerodynamic diameter (EAD) of less than approximately 10 µm. This is one in a series of Standards for the determination of particulate matter in ambient air.

The procedure described in this Standard involves batch sampling and the gravimetric determination of PM_{10}, and makes reference to the United States Code of Federal Regulations, Title 40, Part 50, Appendix J—*Reference method for the determination of particulate matter as PM_{10} in the atmosphere*.

The objective of this Standard is to provide regulatory and testing bodies with a standard method for the determination of suspended particulate matter with an equivalent aerodynamic diameter of less than 10 µm in ambient air.

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 10 µm, as passed by a size selective inlet (PM_{10}). PM_{10} may affect human health end points, including daily mortality, hospital admissions and exacerbation of asthma, and visibility due to their light scattering properties. PM_{10} emission sources include industrial processes, combustion of fuels, burning of vegetation, incineration and natural causes, such as windblown dust and salt-laden air. Important anthropogenic sources include domestic wood heaters and motor vehicles (especially diesel fuelled vehicles).

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METHOD

1 SCOPE

This Standard specifies a gravimetric method for the determination of suspended particulate matter in ambient air. The method provides a measure of mean concentration of PM_{10} over the sampling period employed. A procedure for assessing the performance of PM_{10} samplers, so that they comply with the sampling requirements of this method, is also described.

NOTES:

1 Sampling is normally of 24 h duration to average out the effect of the diurnal variations in particle levels and to enable collection of sufficient mass of particulate matter. Provided that the mass of the filter is determined under carefully controlled laboratory conditions, mean concentrations of 1 $\mu g/m^3$ and greater may be determined using a 24 h sampling period.

2 It is possible that some particulate matter, depending upon its hygroscopicity or volatility may alter in mass from its initial as-sampled state because of the environmental conditions and filter equilibration procedure referred to in Clauses 7.1 and 7.8. The degree of mass change is largely due to the nature of the sampled aerosol and may vary from day to day, site to site and seasonally.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS/NZS

3580 Methods for sampling and analysis of ambient air

3580.1.1 Part 1.1: Guide to siting air monitoring equipment

AS ISO/IEC

17025 General requirements for the competence of testing and calibration laboratories

ISO/IEC

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

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

Code of Federal Regulations—Environmental Protection Agency. 40 CFR, Part 50, Appendix J and Part 53.40 to 53.43 inclusive

3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

3.1 Equivalent aerodynamic diameter (EAD)

The diameter of a spherical particle of density 1000 kg/m^3, which exhibits the same aerodynamic behaviour as the particle in question.

3.2 Measurement uncertainty

A variable associated with the result of a measurement that characterizes the dispersion of the values that could be reasonably attributed to the measurand.

NOTE: The variable may be, for example, a standard deviation (or given multiple of it), or the half-width of an interval having a stated level of confidence. ISO/IEC Guide 98-3 provides a basis of evaluating uncertainty in the output of measurement system.