Australian/New Zealand Standard™

AS/NZS 3580.9.7:2009

Methods for sampling and analysis of ambient air

Method 9.7: Determination of suspended particulate matter—Dichotomous sampler (PM_{10}, coarse PM and $PM_{2.5}$)—Gravimetric method

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 to supersede AS 3580.9.7—1990, *Methods for sampling and analysis of ambient air,* Method 9.7: *Determination of suspended particulate matter—PM_{10} dichotomous sampler—Gravimetric method.*

The objective of this Standard is to provide regulatory and testing bodies with a standard method for determining suspended particulate matter with equivalent aerodynamic diameters of less than 10 µm and 2.5 µm, utilizing a dichotomous sampler and size selective inlet.

The procedure described in this Standard involves batch sampling and the gravimetric determination of coarse PM, $PM_{2.5}$ and PM_{10}.

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 equivalent aerodynamic diameter (EAD) less than 10 µm and 2.5 µm, as passed by a size selective inlet and virtual impactor (PM_{10} and $PM_{2.5}$).

Particles with EAD of 10 µm and less are classified as respirable and hence may affect health. Particles larger than 10 µm generally have nuisance and aesthetic impacts only. PM_{10} emission sources include industrial processes, fuel combustion, burning of vegetation, incineration and natural causes such as wind blown dust and salt laden air.

$PM_{2.5}$ 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).

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METHOD

1 SCOPE

This Standard sets out a gravimetric procedure for the concurrent determination of the PM_{10} and $PM_{2.5}$ fractions of suspended particulate matter in ambient air collected in a dichotomous sampler. The method provides a measure of the mean concentration of PM_{10} over the sampling period of the two size fractions, viz. the fine fraction (less than approximately 2.5 µm) and the coarse fraction (2.5 µm to 10 µm). A procedure for assessing the performance of dichotomous samplers so that they comply with the sampling requirements of this method, is described in Appendix A.

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 µg/m^3 (1.67 L/min sample flow rate) or 1 µg/m^3 (15 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
2162 Verification and use of volumetric apparatus
2162.1 Part 1: General—Volumetric glassware

AS/NZS
3580 Methods for sampling and analysis of ambient air
3580.1.1 Part 1.1: Guide for the siting of sampling units

3760 In-service safety inspection and testing of electrical equipment

AS ISO/IEC
17025 General requirements for the competence of testing and calibration laboratories

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

US Code of Federal Regulations—Environmental Protection Agency 40 CFR, Chapter I, Part 50, Appendix J and Parts 53.4 to 53.43 inclusive

NASA
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