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 3580.9.6—1990. 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 is based on the United States Code of Federal Regulations, Title 40, Chapter 1, Part 50 Appendix J—*Reference method for the determination of particulate matter as PM_{10} in the atmosphere*.

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 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, as measured by this method, generally includes particles with an equivalent aerodynamic diameter of less than 10 μm. Particles of this size range are respirable and hence may affect health. They also can have a major effect on visibility because of their light scattering properties. Such particulate matter is generated by industrial processes, combustion of fuels, burning of vegetation, and incineration. These particles are also present in motor vehicle emissions, wind blown dust and salt laden air.

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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 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 μg/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 volatilily 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 2922	Ambient air—Guide for the siting of sampling units
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)
BS 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
NATA Technical Note 13	Users check of balance calibration
U.S. EPA	US Code of Federal Regulations—Environmental Protection Agency. 40 CFR, Chapter I, Part 50 Appendix J and Parts 53.40 to 53.43 inclusive
U.S. EPA QA/QC	Quality Assurance Handbook, Volume 2. Part 2. September 1997

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 PM_{10}

Atmospheric suspended particulate matter having an approximate EAD of less than 10 μm, which is passed by a size selective inlet having performance characteristics as defined in US Code of Federal Regulations: Title 40, Chapter I, Parts 53.40 to 53.43 inclusive.

NOTE: One of the performance characteristics referred to is that there is a 50% collection efficiency of particles of 10 ±0.5 μm EAD.