Australian/New Zealand Standard™

Methods for sampling and analysis of ambient air

Method 9.3: Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV-007, Methods for the Examination of Air, to supersede AS/NZS 3580.9.3:2003, *Methods for sampling and analysis of ambient air*, Method 9.3: *Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method*. 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 TSP and is based on the United States Code of Federal Regulations, Title 40, Part 50, Appendix B—*Reference method for the determination of suspended particulate matter in the atmosphere (High-volume method)*.

The objective of this Standard is to provide regulatory and testing bodies with a standard method for the determination of TSP in ambient air. This Standard updates the method in line with currently available technology.

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

Total suspended particulate (TSP) matter measured by this method includes particles with an equivalent aerodynamic diameter (EAD) of less than 100 µm, as defined by the sampler. Collection efficiencies for particles larger than 20 µm decrease with increasing EAD. Sources of TSP particles include fuel combustion, industrial processes, motor vehicles, burning of vegetation, incineration and natural causes such as windblown dust.

Smaller particles have been statistically associated with certain human health end points, including daily mortality, hospital admissions and exacerbation of asthma, and affect visibility. Larger particles are a source of nuisance as they soil property.

———————

STANDARDS Australia
STANDARDS® NEW ZEALAND PAEREWA AOTEAROA

METHOD

1 SCOPE

This Standard specifies a gravimetric method for the determination of suspended particulate matter in ambient air. Generally, the particles collected are of equivalent aerodynamic diameter (EAD) of less than 100 µm. The upper size limit of particles collected depends upon sampling conditions, especially wind velocity and direction.

The method provides a measure of mean concentration of TSP over the sampling period employed.

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 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

ISO/IEC

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

US EPA

Code of Federal Regulations—Environmental Protection Agency, 40 CFR, Part 50, Appendix B

3 DEFINITIONS

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

3.1 Total suspended particulate matter (TSP)

Atmospheric suspended particulate matter having an approximate EAD of less than 100 µm.

3.2 Equivalent aerodynamic diameter (EAD)

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

3.3 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.

3.4 U_{95}

A measurement uncertainty at a confidence interval of 95% according to ISO/IEC Guide 98-3.