

AS 4323.2:2023



STANDARDS
Australia



Stationary source emissions

Method 2: Determination of total particulate matter — Isokinetic manual sampling — Gravimetric method



AS 4323.2:2023

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- ACT Health
- Australian Aluminium Council
- Australian Industry Group
- Australian Institute of Refrigeration Air Conditioning and Heating
- Clean Air Society of Australia & New Zealand
- Department of Environment and Science, Qld
- Department of Planning, Industry and Environment, NSW
- Department of Water and Environmental Regulation, WA
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- Assured Environmental
- Ektimo
- Emission Assessments
- Environment Canterbury (NZ)
- Helix Environmental
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Preface

This Standard was prepared by Joint Standards Australia/Standards New Zealand Committee EV-007, Methods for Examination of Air, to supersede AS 4323.2—1995.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to confirm this revision as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to provide regulatory and testing bodies with a standard method for measuring both the concentration and mass emission rate of particulate matter passing through a stack.

The major changes in this edition are as follows:

- (a) Simplified sampling train options.
- (b) More detailed procedures for filter preparation.
- (c) General re-organization of the text and creation of specific sub-sections for some components.

The term “normative” is used in Standards to define the application of the appendices to which it applies. A “normative” appendix is an integral part of a Standard.

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Australian Standard®

Stationary source emissions

Method 2: Determination of total particulate matter — Isokinetic manual sampling — Gravimetric method

1 Scope

This document sets out an isokinetic manual gravimetric method for the determination of filterable particulate matter emitted from stationary sources. The method provides a measure of both the concentration and mass emission rate of particulate matter passing through a stack (including exhaust ducts and other similar outlets) for a defined sampling period.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 4323.1, *Stationary source emissions, Method 1: Selection of sampling positions and measurement of velocity in stacks*

US EPA Method 4, *Determination of moisture content in stack gases*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

access hole

hole in the stack at the extremity of a sampling traverse through which test equipment is inserted

3.2

gas stream

gaseous mixture which may carry particulate matter flowing in a stack

3.3

isokinetic sampling

sampling at a rate such that the velocity and direction of the gas entering the sampling nozzle is the same as that of the gas in the sampled gas stream at the sampling point

3.4

mass emission rate

mass of particulate matter passing through the sampling plane per unit time

3.5

may

indicates the existence of an option

3.6

measurement uncertainty

non-negative parameter characterizing the dispersion of the values being attributed to a measurand based on the information used

3.7**particulate matter**

particles of any shape, structure or density dispersed in the gas stream

3.8**particulate matter concentration**

mass of particulate matter per unit volume of sample gas stream expressed on a dry basis at standard conditions

3.9**representative sample**

sample which has the same characteristics as the gas stream passing through the sampling plane at the time of sampling

3.10**sampling nozzle**

that part of the equipment which first admits a sample of the gas stream to the sampling train

3.11**sampling plane**

plane normal to the axis of the stack at which sampling takes place

3.12**sampling point**

one of a number of specific locations on a sampling traverse at which sampling takes place

3.13**sampling traverse**

imaginary line in the sampling plane along which sampling points are located

3.14**shall**

indicates that a statement is mandatory

3.15**should**

indicates a recommendation

3.16**stack**

structure through which the gas stream passes, including process stream and exhaust ducts

3.17**standard conditions**

gas pressure and temperature conditions to which volumetric calculations are referred

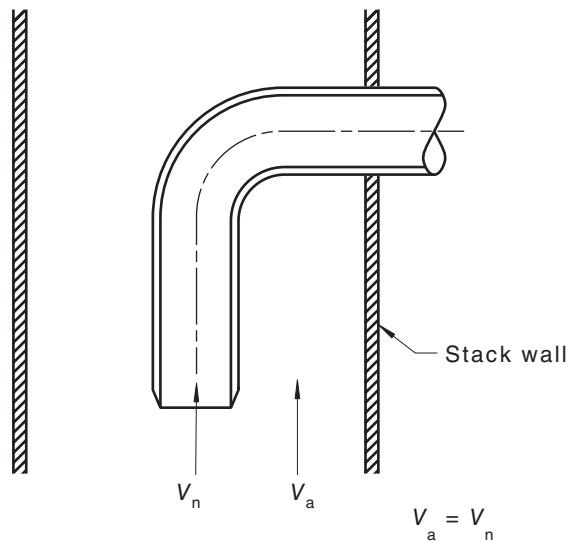
Note 1 to entry: For the purposes of this document, standard conditions are 101.3 kPa, 0 °C and dry gas.

3.18**static pressure**

pressure at a specific point in a fluid which has no element due to velocity of the fluid

4 Principle

A representative sample of the particulate matter in the gas stream of a stack is withdrawn through a nozzle isokinetically (see [Figure 1](#)) and collected on a pre-weighed filter. The mass of particulate matter is then determined gravimetrically and related to the volume of gas sampled to give a concentration result.



Key

V_a = actual stack velocity

V_n = velocity of gases entering the nozzle

Figure 1 — Isokinetic sampling

5 Apparatus

5.1 Sampling train

Sampling train equipment shall conform to the configuration shown in either [Figure 2](#) or [Figure 3](#). The filter holder is located either in (in-stack) or out (out-stack) of the gas stream under consideration. In-stack sampling is preferable where the gas stream temperature is above the dewpoint. All trains shall have a moisture removal device upstream of the gas metering device. [Figures 2](#) and [3](#) represent the following sampling train types:

- (a) [Figure 2](#) — Particulate matter sampling train with in-stack filter.
- (b) [Figure 3](#) — Particulate matter sampling train with out-stack filter.

NOTE The figures are based on schematic diagrams in US EPA Method 5 and Method 17, which set out methods for determining particulate matter.