AS 3640—2009

Australian Standard®

# Workplace atmospheres—Method for sampling and gravimetric determination of inhalable dust



This Australian Standard® was prepared by Committee CH-031, Methods for Examination of Workplace Atmospheres. It was approved on behalf of the Council of Standards Australia on 14 September 2009.
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The following are represented on Committee CH-031:

- Australian Aluminium Council
- Australian Chamber of Commerce and Industry
- Australian Institute of Occupational Hygienists
- Australian Mines and Metals Association
- Bureau of Steel Manufacturers of Australia
- Clean Air Society of Australia & New Zealand
- Coal Services
- Commonwealth Department of Health and Ageing
- Department for Administrative and Information Services, SA
- Department of Consumer & Employment Protection, WA
- Department of Mineral Resources, NSW
- National Association of Testing Authorities Australia
- WorkCover New South Wales

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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# Workplace atmospheres—Method for sampling and gravimetric determination of inhalable dust

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# PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH-031, Methods for Examination of Workplace Atmospheres to supersede AS 3640—2004, *Workplace atmospheres—Method for sampling and gravimetric determination of inspirable dust*. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this revision is to incorporate minor changes to enable calibration laboratories to meet the requirements for the balance and uncertainty requirements.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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# FOREWORD

Most airborne industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the response that it elicits depend on the nature and size of the particle.

Occupational hygiene practice commonly differentiates between two size fractions of airborne dust, namely respirable and inhalable dust. A method for determining respirable dust is described in AS 2985, *Workplace atmospheres—Method for sampling and gravimetric determination of respirable dust.*

For dusts which may have toxic effects if absorbed in the nasopharyngeal (nose and throat) region or which may have toxic effects if ingested after deposition in the nasopharyngeal region, it is appropriate to measure 'inhalable' dust. This applies whether or not these dusts also have a toxic effect on the lungs or are toxic if absorbed in the lungs or are swallowed after clearance from the lungs.

Examples are:

(a) Highly soluble materials that can quickly enter the blood and exhibit their toxicity, e.g. nicotine and soluble salts.

(b) Materials that can exhibit toxicity after dissolving in the gastrointestinal tract, e.g. toxic metals.

(c) Materials that can exhibit toxicity at the deposition site, e.g. acids and nasal carcinogens such as hardwood dusts.

It is appropriate to measure respirable dust when the dust has a toxic effect if it is deposited in the alveolar region (deepest recesses) of the lungs. This usually applies to toxic insoluble particles.

STANDARDS AUSTRALIA

# Australian Standard

# Workplace atmospheres—Method for sampling and gravimetric determination of inhalable dust

## 1 SCOPE

This Standard sets out a method for the collection and gravimetric determination of inhalable dust in workplace atmospheres. It does not consider the measurement of 'respirable' dust, which is covered in AS 2985, but does include the non-vapour components of mists.

## 2 OBJECTIVE

The objective of this Standard is to provide a method to assess personal exposure to inhalable dust by sampling in a worker's breathing zone.

Whilst the method allows only for personal sampling, it can also be used to assist in controlling the occupational environment by means of static samples, i.e. samples taken at fixed locations. However, static samples should never be used to evaluate health risks unless a specific requirement indicates otherwise.

NOTES:

1 The limit of detection is determined primarily by the length of the sampling period and the sensitivity and precision of the weighing procedure used for the collected sample. These factors should be chosen to ensure that the limit of detection is at least one order of magnitude lower than the appropriate occupational exposure standard.

2 For additional chemical analysis of the dust components, other factors such as filter type and treatment should be taken into account.

## 3 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
2985 Workplace atmospheres—Method for sampling and gravimetric determination of respirable dust

AS/NZS
60079 Explosive atmospheres
60079.10.1 Part 10.1: Classification of areas—Explosive gas atmospheres
60079.11 Part 11: Equipment protection by intrinsic safety 'i'
61241 Electrical apparatus for use in the presence of combustible dust
61241.3 Part 3: Classification of areas where combustible dusts are or may be present

ISO
7708 Air quality—Particle size fraction definitions for health-related sampling
15767 Workplace atmospheres—Controlling and characterizing uncertainty in weighing collected aerosols
20988 Air quality—Guidelines for estimating measurement uncertainty