Australian Standard™

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

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STANDARDS AUSTRALIA

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 22 January 2004 and published on 24 February 2004.

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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
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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—1989, *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 align this Standard more closely with international practices in the field of health-related workplace dust measurement. Since the publication of the previous edition, the International Standards Organization has superseded its technical report with ISO 7708:1995, *Air quality—Particle size fraction—Definitions for health-related sampling*. To reflect this change the title of the Standard has been changed—'inspirable dust' is now 'inhalable dust'.

Sampling devices other than those previously specified have now become available and are included in the Standard.

The Committee is aware of the role that errors, especially in weighing, play in the overall uncertainty of the measurements and has attempted to address the issue in this revision, by reference to a new international Standard, ISO 15767:2003, *Workplace atmospheres—Controlling and characterizing errors in weighing collected aerosols*.

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 those 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 which can quickly enter the blood and exhibit their toxicity, e.g. nicotine and soluble salts.

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

(c) Materials which 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.

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Australian Standard

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

1 SCOPE

This Standard sets out a gravimetric method for the collection and 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 sampling, 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

2380 Electrical equipment for explosive atmospheres—Explosion protection techniques

2380.7 Part 7: Intrinsic safety i

2430 Classification of hazardous areas

2430.1 Part 1: Explosive gas atmospheres

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

AS/NZS

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 errors in weighing collected aerosols

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