

Australian Standard™

**Method for the qualitative identification
of asbestos in bulk samples**

This Australian Standard was prepared by Committee CH-031, Methods for the Examination of Workplace Atmospheres. It was approved on behalf of the Council of Standards Australia on 20 February 2004 and published on 24 March 2004.

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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 and New Zealand
Coal Services
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This Standard was issued in draft form for comment as DR 02125.

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First published as AS 4964—2004.

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Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 5851 7

PREFACE

This Standard was prepared by Standards Australia Committee CH-031 Methods for the Examination of Workplace Atmospheres from a NATA Guidance Note - *Identification of Asbestos in Bulk Samples* compiled by NATA's Occupational Hygiene Technical Group.

The Standard describes polarized light microscopy (PLM) as the primary technique for identification because of its simplicity, low cost, relevance and detection limits. The determination of principal refractive indices by dispersion staining (DS) on its own is not sufficient and needs to be used in conjunction with various other optical properties using PLM.

The Standard sets out relatively simple aspects of sample preparation and PLM that enable a large proportion of commercial samples to be identified, even though some samples will be difficult or impossible to analyze. These samples may require the use of an independent confirming technique such as infrared spectroscopy, X-ray diffraction, scanning electron microscopy or transmission electron microscopy, if PLM fails to give an unequivocal identification, or they require more complex sample preparation.

The Committee considers analysts inexperienced in asbestos identification should not undertake work in this area without making personal contact with an experienced occupational hygienist or analyst to obtain training in the technique involved. Internal and external quality assurance testing should be used to help ensure the continuing competency of analysts.

The procedure has the following known limitations:

- (a) PLM is a qualitative technique only.
- (b) It does not cover the identification of airborne and water-borne asbestos.
- (c) Most samples of tremolite, actinolite and anthophyllite show a wide range of optical properties and can not be equivocally identified by PLM and dispersion staining.
- (d) For valid asbestos identification there must be sufficient sample of the unknown fibres for them to exceed the practical detection limit of the technique used. To report 'trace' levels using confirming techniques the fibres must be observed at 'trace' levels by PLM, because of the difference in detection limits between the techniques. Appendix A discusses some of these differences.

The United Kingdom Health and Safety Executive (HSE) Method for the Determination of Hazardous Substances (MDHS77, June 1994), 'Asbestos in Bulk Materials - Sampling and Identification by Polarized Light Microscopy', can be used for guidance. Refer to Appendix B for minor adaptations for Australian conditions that should be applied to MDHS77, as well as additional techniques comments on the technique.

No attempt has been made in the Standard to quantify the amount of asbestos present apart from the descriptive terms 'asbestos detected', 'trace asbestos detected' or 'no asbestos detected'. The Committee considered that quantification of the technique would not be practicable, and not required in most situations. More complicated analysis may be prohibitively costly without yielding any more practical information. It was considered the qualitative terms would be sufficient for a risk assessment to be made.

This Standard incorporates principles set out in the NATA publication *ISO/IEC 17025 Application Document, Supplementary Requirements for Accreditation in the Field of Chemical Testing*.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard

Method for the qualitative identification of asbestos in bulk samples

1 SCOPE

This Standard sets out a method for the qualitative identification of amosite, crocidolite and chrysotile in bulk samples by polarized light microscopy (PLM) and dispersion staining (DS) techniques. It does not cover the identification of airborne and water-borne asbestos.

The techniques used in this Standard ensure that -

- (a) either homogeneous or non-homogenous matter can be analysed;
- (b) fibres are able to be differentiated from the parent mineral;
- (c) chrysotile, amosite and crocidolite asbestos fibres are able to be unequivocally identified; and
- (d) the practical limit of detection can be determined as a part of the method validation.

2 OBJECTIVE

The objective of the Standard is to provide laboratories with a method of qualitative identification of amosite, crocidolite and chrysotile asbestos in bulk samples by polarized light microscopy (PLM) and dispersion staining (DS) techniques. Bulk samples include building materials, soils and ores.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- 4433 Guide to the sampling of particulate materials
- 4433.1 Part 1: Sampling procedures

AS

- 4482 Guide to the sampling and investigation of potentially contaminated soil
- 4482.1 Part 1: Non-volatile and semi-volatile compounds

ISO

- 3082 Iron ores - Sampling and sample preparation procedures

BS

- 1377 Methods of test for soils for civil engineering purposes.
- 1377-1 Part 1: General requirements and sample preparation

BS EN

- 932 Tests for general properties of aggregates
- 932-1 Part 1: Methods for sampling

NOTE: Additional reading is listed in Appendix E.

4 DEFINITIONS

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