

Reference Methods For Analyzing For Asbestos in Various Media

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Microscopy remains the primary tool for the analysis and quantification of asbestos in occupational and environmental studies. The American Society for Testing and Materials (ASTM) has recently approved two new Standard Methods for the analysis of asbestos in settled dust. Both methods require the use of a transmission electron microscope (TEM) equipped with an energy dispersive x-ray analysis system. Other methods currently in use require the use of a polarized light microscope (PLM) or phase contrast microscope (PCM).

In 1987 a list of the microscopy methods used for the analysis of asbestos was compiled and published. Since that time a number of new methods for the analysis of asbestos in various media have been developed and distributed. The following is a current list of reference methods.

Bulk Building Materials:

Interim Method for the Determination of Asbestos in Bulk Insulation Samples. EPA-600/M4-82-020, December 1982 (PLM)

Method for the Determination of Asbestos in Bulk Building Materials. EPA-600/R-93/116, July 1993 (PLM)

"Asbestos (bulk) by Polarized Light Microscopy (PLM)" - Method 9002 - NIOSH Manual of Analytical Methods, 4th Ed., U.S. Department of HHS, NIOSH Publ. 94-113, 1994 (PLM).

Occupational Air Sampling And Analysis:

"Asbestos and Other Fibers by Phase Contrast Microscopy (PCM)" - Manual 7400 - NIOSH Manual of Analytical Methods, 4th Ed., U.S. Department of HHS, NIOSH Publ. 94-113, 1994 (PCM).

"Asbestos Fibers by Transmission Electron Microscopy (TEM)" - Method 7402 - NIOSH Manual of Analytical Methods, 4th Ed., U.S. Department of HHS, NIOSH Publ. 94-113, 1994 (TEM).

Drinking Water

EPA Method 100.1 (EPA-600-4-83-043) "Analytical Method For The Determination Of Asbestos In Water" by E.J. Chatfield and M.J. Dillon, Available from NTIS, Order Number PB83-260471, 1983 (TEM).

EPA Method 100.2 (EPA-600-R-94-134) "Determination Of Asbestos Structures Over 10 μ m in Length In Drinking Water" by K.A. Brackett, P.J. Clark, and J.R. Millette. Available from NTIS, Order Number PB94-201902, 1994 (TEM).

EPA Memorandum "Guidance and Clarification on the Analysis of Asbestos" by James M. Conlon, March 1993. Available from the U.S. EPA Regional Drinking Water Office or from Ms. Mary Ann Feige, U.S. EPA Research Center, 26 W.M.L.K. Drive, Cincinnati, OH 45268.

Ambient Air Testing:

International Standards Organization (ISO), Ambient Air - Determination of Asbestos Fibres - Direct-transfer Transmission Electron Microscopy Procedure. ISO 10312 (approved 1993). (TEM).

School Clearance by Aggressive Air Testing Following Abatement:

Appendix A to Subpart E - Interim Transmission Electron Microscopy Analytical Methods, U.S. EPA, 40 CFR Part 763. Asbestos-Containing Materials in Schools, Final Rule and Notice. Fed. Reg. 52(210): 41857-41894 (1987). (TEM).

Settled Dust:

ASTM D5755, Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentration. 1995 (TEM).

ASTM D5756, Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Mass Concentration. 1995 (TEM).

For soils and materials at Superfund sites, an interim method has been prepared and distributed as:

Superfund Method For the Determination of Releasable Asbestos in Soils and Bulk Materials. (Interim Version) Berman, D.W. and Kolk, A. Prepared for U.S. EPA, Region 9, San Francisco, CA. Contract Number: 68-W9-0059, July 1995. (TEM)

A Number of ASTM Drafts are "In the Works". These include:

ASTM - Test Method for Determination of Asbestos Fibers in Ambient Air, Direct-transfer Transmission Electron Microscopy Procedure (TEM).

ASTM - Test Method for Sampling and Direct Analysis of Dust For Asbestos by Transmission Electron Microscopy (TEM).

ASTM - Test Method for Passive Sampling and Analysis of Dust For Asbestos by Transmission Electron Microscopy (TEM).

ASTM - Test Method for Wipe Sampling and Analysis of Dust For Asbestos by Transmission Electron Microscopy (TEM).

ASTM - Test Method for Determination of Asbestos in Bulk Building Materials (PLM).

ASTM - Guide for Evaluation of Asbestos on Surfaces.

Reference:

1. Millette, J.R.; Krewer, J.A.; A Reference List of Microscopical Methods for the Measurement of Asbestos, *Microscope*, 35:311-318, 1987.

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