



Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Mass Surface Loading¹

This standard is issued under the fixed designation D 5756; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a procedure to (a) identify asbestos in dust and (b) provide an estimate of the surface loading of asbestos in the sampled dust, reported as either the mass of asbestos per unit area of sampled surface or as the mass of asbestos per mass of sampled dust.

1.1.1 If an estimate of asbestos structure counts is to be determined, the user is referred to Test Method D 5755.

1.2 This test method describes the equipment and procedures necessary for sampling, by a microvacuum technique, non-airborne dust for levels of asbestos. The non-airborne sample is collected inside a standard filter membrane cassette from the sampling of a surface area for dust which may contain asbestos.

1.2.1 This procedure uses a microvacuuming sampling technique. The collection efficiency of this technique is unknown. Variability of collection efficiency for any particular substrate and across different types of substrates is also unknown. The effects of sampling efficiency differences and variability on the interpretation of dust sampling measurements have not been determined.

1.3 Asbestos identified by transmission electron microscopy (TEM) is based on morphology, selected area electron diffraction (SAED), and energy dispersive X-ray analysis (EDXA). Some information about structure size is also determined.

1.4 This test method is generally applicable for an estimate of the surface loading of asbestos starting from approximately 0.24 pg of asbestos per square centimetre (assuming a minimum fiber dimension of 0.5 μm by 0.025 μm, see 17.8), but will vary with the analytical parameters noted in 17.8.

1.4.1 The procedure outlined in this test method employs an indirect sample preparation technique. It is intended to disaggregate and disperse asbestos into fibrils and fiber bundles that can be more accurately identified, counted, and sized by transmission electron microscopy. However, as with all indirect sample preparation techniques, the asbestos observed for

quantitation may not represent the physical form of the asbestos as sampled. More specifically, the procedure described neither creates nor destroys asbestos, but it may alter the physical form of the mineral fibers.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water²

D 3195 Practice for Rotameter Calibration³

D 5755 Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number surface loadings³

D 6620 Practice for Determining a Detection Limit for Asbestos Measurements Based on Counts³

E 832 Specification for Laboratory Filter Papers⁴

2.2 ISO Standards:

ISO/10312 Ambient Air: Determination of Asbestos Fibers; Direct Transfer Transmission Electron Microscopy Procedure⁵

ISO/CD13794 Ambient Air: Determination of Asbestos Fibers; Indirect-Transfer Transmission Electron Microscopy Procedure⁵

3. Terminology

3.1 Definitions:

3.1.1 *asbestiform*—a special type of fibrous habit in which the fibers are separable into thinner fibers and ultimately into fibrils. This habit accounts for greater flexibility and higher

¹ This test method is under the jurisdiction of ASTM Committee D22 on Sampling and Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.07 on Sampling and Analysis of Asbestos.

Current edition approved November 10, 2002. Published January 2003. Originally approved in 1995. Last previous edition approved in 1995 as D5756 - 95.

² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 11.03.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.