



Designation: D6281 – 23

Standard Test Method for Airborne Asbestos Concentration in Ambient and Indoor Atmospheres as Determined by Transmission Electron Microscopy Direct Transfer (TEM)¹

This standard is issued under the fixed designation D6281; 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 method² is an analytical procedure using transmission electron microscopy (TEM) for the determination of the concentration of asbestos structures in ambient atmospheres and includes measurement of the dimension of structures and of the asbestos fibers found in the structures from which aspect ratios are calculated.

1.1.1 This test method allows determination of the type(s) of asbestos fibers present.

1.1.2 This test method cannot always discriminate between individual fibers of the asbestos and non-asbestos analogues of the same amphibole mineral.

1.2 This test method is suitable for determination of asbestos in both ambient (outdoor) and building atmospheres.

1.2.1 This test method is defined for polycarbonate capillary-pore filters or cellulose ester (either mixed esters of cellulose or cellulose nitrate) filters through which a known volume of air has been drawn and for blank filters.

1.3 The upper range of concentrations that can be determined by this test method is 7000 s/mm². The air concentration represented by this value is a function of the volume of air sampled.

1.3.1 There is no lower limit to the dimensions of asbestos fibers that can be detected. In practice, microscopists vary in their ability to detect very small asbestos fibers. Therefore, a minimum length of 0.5 μ m has been defined as the shortest fiber to be incorporated in the reported results.

1.4 The direct analytical method cannot be used if the general particulate matter loading of the sample collection filter as analyzed exceeds approximately 10 % coverage of the collection filter by particulate matter.

¹ This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.07 on Sampling, Analysis, Management of Asbestos, and Other Microscopic Particles.

Current edition approved Sept. 1, 2023. Published September 2023. Originally approved in 1998. Last previous edition approved in 2015 as D6281 – 15. DOI: 10.1520/D6281-23.

² This test method was adapted from International Standard ISO 10312 “Air quality—Determination of asbestos fibres—Direct transfer transmission electron microscopy method.”

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*³

D1193 Specification for Reagent Water

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D1357 Practice for Planning the Sampling of the Ambient Atmosphere

D4483 Practice for Evaluating Precision for Test Method Standards in the Rubber and Carbon Black Manufacturing Industries

D6620 Practice for Asbestos Detection Limit Based on Counts

D7712 Terminology for Sampling and Analysis of Asbestos

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 *ISO Standard:*⁴

ISO 10312 Ambient air - Determination of asbestos fibres - Direct-transfer transmission electron microscopy method

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.