



Designation: D5955 – 02 (Reapproved 2017)^{ε1}

Standard Test Methods for Estimating Contribution of Environmental Tobacco Smoke to Respirable Suspended Particles Based on UVPM and FPM¹

This standard is issued under the fixed designation D5955; 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.

^{ε1} NOTE—Reapproved with editorial changes and warning notes editorially updated throughout in March 2017.

1. Scope

1.1 These test methods pertain to the sampling/analysis of respirable suspended particles (RSP) and the estimation of the RSP fraction attributable to environmental tobacco smoke (ETS). These test methods are based on collection of total RSP on a membrane filter, extracting the collected material in methanol, and measuring total ultraviolet absorbance or fluorescence, or both, of this extract. The corresponding methods of estimation are termed ultraviolet particulate matter (UVPM) and fluorescent particulate matter (FPM), respectively.

1.2 These test methods are compatible with, but do not require the determination of solanesol, which is also used to estimate the contribution of ETS to RSP (see Test Method [D6271](#)).

1.3 The sampling components consist of a preweighed, 1.0-μm pore size polytetrafluoroethylene (PTFE) membrane filter in a filter cassette connected on the inlet end to a particle size separating device and, on the outlet end, to a sampling pump. These test methods are applicable to personal and area sampling.

1.4 These test methods are limited in sample duration only by the capacity of the membrane filter (about 2000 μg). These test methods have been evaluated up to a 24-h sample duration with a minimum sample duration of at least 1 h.

1.5 Limits of detection (LOD) and quantitation (LOQ) for the UVPM test method at a sampling rate of 2 L/min are, respectively, 2.5 μg/m³ and 8.3 μg/m³ for a 1-h sample duration and 0.3 μg/m³ and 1.0 μg/m³ for an 8-h sample duration. The LOD and LOQ for the FPM test method at a sampling rate of 2 L/min are, respectively, 1.4 μg/m³ and 4.7 μg/m³ for a 1-h sample duration and 0.2 μg/m³ and 0.6 μg/m³ for an 8-h sample duration.

¹ These test methods are under the jurisdiction of ASTM Committee [D22](#) on Air Quality and are the direct responsibility of Subcommittee [D22.05](#) on Indoor Air.

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1.6 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 *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.* Specific precautionary information is given in [13.6](#).

1.8 *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:²

- [D1356 Terminology Relating to Sampling and Analysis of Atmospheres](#)
- [D1357 Practice for Planning the Sampling of the Ambient Atmosphere](#)
- [D3631 Test Methods for Measuring Surface Atmospheric Pressure](#)
- [D5337 Practice for Flow Rate Adjustment of Personal Sampling Pumps](#)
- [D6271 Test Method for Estimating Contribution of Environmental Tobacco Smoke to Respirable Suspended Particles Based on Solanesol](#)

3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods, refer to Terminology [D1356](#).

² 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.