



Standard Test Method for Estimating Contribution of Environmental Tobacco Smoke to Respirable Suspended Particles Based on Solanesol¹

This standard is issued under the fixed designation D6271; 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 the sampling/analysis of respirable suspended particles (RSP) and the estimation of the RSP fraction attributable to environmental tobacco smoke (ETS). The test method is based on collection of total RSP on a membrane filter, extraction of the filter in methanol, and determination of solanesol, a C₄₅ isoprenoid alcohol, by high performance liquid chromatography (HPLC) with ultraviolet (UV) detection.

1.2 This test method is compatible with the determinations of gravimetric RSP, ultraviolet particulate matter (UVP), and fluorescent particulate matter (FPM) (see Test Methods D5955), but does not require them. UVP and FPM, which are based on the ultraviolet absorbance and fluorescence of the filter extract, are also used to estimate the contribution of ETS to RSP.

1.3 The sampling components consist of a 1.0- μ m 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. This test method is applicable to personal and area sampling.

1.4 This test method is limited in sample duration only by the capacity of the membrane filter. The test method has been evaluated up to 24-h sample duration; a minimum sample duration of 1 h is recommended.

1.5 Limits of detection (LOD) for this test method at a sampling rate of 2 L/min are 0.042 μ g/m³ for 1-h sample duration and 0.005 μ g/m³ for 8-h sample duration.

1.6 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 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.

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

D5955 Test Methods for Estimating Contribution of Environmental Tobacco Smoke to Respirable Suspended Particles Based on UVP and FPM

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D1356.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *environmental tobacco smoke (ETS)*—an aged, dilute composite of exhaled tobacco smoke (exhaled mainstream smoke) and smoke from tobacco products (sidestream smoke).

3.2.2 *respirable suspended particles (RSP)*—particles which can be deposited in the gas-exchange region of the lung and are defined as particles that pass through a sampler having a 4.0- μ m median cutpoint (1).³

3.2.3 *solanesol particulate matter (Sol-PM)*—a tobacco-selective marker for the contribution of ETS particulate matter to RSP.

4. Summary of Test Method

4.1 A known volume of air is drawn through an inertial impactor or cyclone assembly separating at 4.0 μ m to separate

¹ This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

Current edition approved March 1, 2016. Published March 2016. Originally approved in 1998. Last previous edition approved in 2010 as D6271 – 10. DOI: 10.1520/D6271-10R16.

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.

³ The boldface numbers in parentheses refer to a list of references at the end of this standard.