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.

Designation: D4096 – 17 (Reapproved 2023)

Standard Test Method for Determination of Total Suspended Particulate Matter in the Atmosphere (High–Volume Sampler Method)[1]

This standard is issued under the fixed designation D4096; 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 provides for sampling a large volume of atmosphere, 1600 m^3 to 2400 m^3 (55 000 ft^3 to 85 000 ft^3), by means of a high flow-rate vacuum pump at a rate of 1.13 m^3/min to 1.70 m^3/min (40 ft^3/min to 60 ft^3/min) (**1-4**).[2]

1.2 This flow rate allows suspended particles having diameters of less than 100 µm (stokes equivalent diameter) to be collected. However, the collection efficiencies for particles larger than 20 µm decreases with increasing particle size and it varies widely with the angle of the wind with respect to the roof ridge of the sampler shelter and with increasing speed (**5**). When glass fiber filters are used, particles within the size range of 100 µm to 0.1 µm diameters or less are ordinarily collected.

1.3 The upper limit of mass loading will be determined by plugging of the filter medium with sample material, which causes a significant decrease in flow rate (see 6.4). For very dusty atmospheres, shorter sampling periods will be necessary. The minimum amount of particulate matter detectable by this method is 3 mg (95 % confidence level). When the sampler is operated at an average flow rate of 1.70 m^3/min (60 ft^3/min) for 24 h, this is equivalent to 1 µg/m^3 to 2 µg/m^3 (**3**).

1.4 The sample that is collected may be subjected to further analyses by a variety of methods for specific constituents.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered 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]

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D1357 Practice for Planning the Sampling of the Ambient Atmosphere

D2986 Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test (Withdrawn 2004)[4]

D3631 Test Methods for Measuring Surface Atmospheric Pressure

E1 Specification for ASTM Liquid-in-Glass Thermometers

2.2 *Other Documents:*

EPA-600/9-76-005 Quality Assurance Handbook for Air Pollution Measurement Systems, Vol I, Principles (December 1984 Rev.)[5]

EPA-600/4-77-027a Quality Assurance Handbook for Air Pollution Measurement Systems, Vol II, Ambient Air Specific Methods[5]

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *absolute filter, n*—a filter or filter medium of ultra-high collection efficiency for very small particles (submicrometre

[1] This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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

[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] The last approved version of this historical standard is referenced on www.astm.org.

[5] Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, http://www.epa.gov.

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