



Designation: D6494 – 22

Standard Test Method for Determination of Asphalt Fume Particulate Matter in Workplace Atmospheres as Benzene Soluble Fraction¹

This standard is issued under the fixed designation D6494; 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 determination of asphalt fume particulate matter (as benzene soluble fraction) and total particulate matter weight in workplace atmospheres using a polytetrafluoroethylene (PTFE) filter methodology.

1.2 This procedure has been adapted from NIOSH Method 5023 (withdrawn prior to 4th edition (1994) and replaced in 1998 with NIOSH Method 5042) and OSHA Method 58. This adaptation was made to reduce the level of background contamination providing better reproducibility.

1.3 This procedure is compatible with high flow rate personal sampling equipment—0.5 to 2.0 L/min. It can be used for personal or area monitoring.

1.4 The sampling method develops a time-weighted average (TWA) sample and can be used to determine short-term exposure limit (STEL).

1.5 The applicable concentration range for the TWA sample is from 0.2 to 2.0 mg/m³.

NOTE 1—A study has suggested candidate solvents for benzene replacement.² A less toxic solvent for this analysis would be more appropriate, although the substitution with a solvent other than benzene needs further validations with field data.

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 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. For more specific precautionary statements, see Section 9.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization 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

D4840 Guide for Sample Chain-of-Custody Procedures

D5337 Practice for Flow Rate Adjustment of Personal Sampling Pumps

D6062 Guide for Personal Samplers of Health-Related Aerosol Fractions

D8358 Guide for Assessment and Inclusion of Wall Deposits in the Analysis of Single-Stage Samplers for Airborne Particulate Matter

2.2 Occupational Safety and Health Administration (OSHA) Methods:⁴

OSHA Method 58 Coal Tar Pitch Volatiles

2.3 National Institute for Occupational Safety and Health (NIOSH) Manual of Analytical Methods:⁵

NIOSH Method 5023 Coal Tar Pitch Volatiles

NIOSH Method 5042 Benzene—Soluble Fraction and Total Particulate (Asphalt Fume)

2.4 Other Documents:

ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories⁶

3. Terminology

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

¹ This test method is under the jurisdiction of ASTM Committee **D22** on Air Quality and is the direct responsibility of Committee **D22.04** on Workplace Air Quality.

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² Sutter, B., Ravera, C., Hussard, C., Langlois, E., “Alternatives for Benzene in the Extraction of Bitumen Fume from Exposure Sample Media,” *Ann. Occup. Hyg.*, Vol 60, No. 1, 2015, pp. 101–112.

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 Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., NW, Washington, DC 20210, <http://www.osha.gov>.

⁵ Available from National Institute for Occupational Safety and Health (NIOSH), Cincinnati, OH. <http://www.cdc.gov>

⁶ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.