



Standard Practice for Analysis of Organic Compound Vapors Collected by the Activated Charcoal Tube Adsorption Method¹

This standard is issued under the fixed designation D 3687; 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 practice covers the applications of methods for the desorption and gas chromatographic determination of organic vapors that have been adsorbed from air in sampling tubes packed with activated charcoal.

1.2 This practice is complementary to Practice D 3686.

1.3 This practice is applicable for analysis of samples taken from workplace or other atmospheres, provided that the contaminant adsorbs onto charcoal and that it can be analyzed by gas chromatography. A partial list of organic compounds for which this method is applicable is given in A1 in Practice D 3686.

1.4 Organic compounds of multicomponent samples may mutually interfere during analysis. Methods to resolve interferences are given in Section 6.

1.5 *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 precautions are given in 8.1.4.2 and Annex A1.

2. Referenced Documents

2.1 ASTM Standards:

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres²

D 3686 Practice for Sampling Atmospheres to Collect Organic Compound Vapors (Activated Charcoal Tube Adsorption Method)²

E 355 Practice for Gas Chromatography Terms and Relationships³

2.2 NIOSH Standards:

CDC-99-74-45 Documentation of NIOSH Validation Tests⁴

Manual of Analytical Methods, 2nd Ed.⁴

¹ This practice is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres, and is the direct responsibility of Subcommittee D 22.04 on Analysis of Workplace Atmospheres.

Current edition approved Feb. 15, 1995. Published April 1995. Originally published as D 3687 – 78. Last previous edition D 3687 – 89.

² Annual Book of ASTM Standards, Vol 11.03.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Available from the U.S. Department of Commerce, National Technical Information Service, Port Royal Road, Springfield, VA 22161.

2.3 OSHA Standard:

29 CFR 1910 General and Industrial OSHA Safety and Health Standard⁵

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this practice, refer to Terminology D 1356, and E 355.

3.1.2 *relative retention time (RRT)*—a ratio of RTs' for two chemicals for the same chromatographic column and carrier gas flow rate, where the denominator represents a reference chemical.

3.1.3 *retention time (RT)*—time to elute a specific chemical from a chromatographic column, for a specific carrier gas flow rate, measured from the time the chemical is injected into the gas stream to when it appears at the detector.

4. Summary of Practice

4.1 Organic vapors, which have been collected on activated charcoal and eluted therefrom with carbon disulfide or other appropriate desorbent, are determined by gas-liquid chromatography, using a flame ionization detector and other appropriate detectors.

4.2 Interferences resulting from the analytes having similar retention times during gas-liquid chromatography are resolved by improving the resolution or separation, such as by changing the chromatographic column or operating parameters, or by fractionating the sample by solvent extraction.

4.3 Peaks are identified using techniques such as GC/MS and dual column chromatography.

5. Significance and Use

5.1 Promulgations by the Federal Occupational Safety and Health Administration (OSHA) in 29 CFR 1910 designate that certain organic compounds must not be present in workplace atmospheres at concentrations above specified values.

5.2 This practice, when used in conjunction with Practice D 3686, will promote needed accuracy and precision in the determination of airborne concentrations of many of the organic chemicals given in 29 CFR 1910, CDC-99-74-45, and the Manual of Analytical Methods. It can be used to determine

⁵ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.