



Standard Test Method for Determination of Volatile Organic Chemicals in Atmospheres (Canister Sampling Methodology)¹

This standard is issued under the fixed designation D 5466; 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 describes a procedure for sampling and analysis of volatile organic compounds (VOCs) in ambient, indoor, or workplace atmospheres. The test method is based on the collection of air samples in passivated stainless steel canisters. The VOCs are subsequently removed from the canisters, separated by gas chromatography, and measured by a mass spectrometric detector. This test method describes procedures for sampling into canisters to final pressures both above and below atmospheric pressure (respectively referred to as pressurized and subatmospheric pressure sampling).²

1.2 This test method is applicable to specific VOCs that have been tested and determined to be stable when stored in pressurized and subatmospheric pressure canisters. Numerous compounds, many of which are chlorinated VOCs, have been successfully tested for storage stability in pressurized canisters (**1, 2**).³ While not as extensive, documentation is currently also available demonstrating stability of VOCs in subatmospheric pressure canisters.

1.3 The organic compounds that have been successfully collected in pressurized canisters by this test method are listed in Table 1. These compounds have been successfully measured at the parts per billion by volume (ppbv) level. This test method is applicable to concentrations of VOC from the detection limit to 300 ppb by volume. Above this concentration samples require dilution with dry ultra high purity nitrogen or air.

1.4 *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.* Safety practices should be part of the user's SOP manual.

2. Referenced Documents

2.1 ASTM Standards:

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres⁴

D 1357 Practice for Planning and Sampling of the Ambient Atmosphere⁴

E 260 Practice for Packed Column Gas Chromatography⁵

E 355 Practice for Gas Chromatography Terms and Relationships⁵

2.2 Other Documents:

U.S. Environmental Protection Agency Technical Assistance Document for Sampling and Analysis of Toxic Organic Compounds in Ambient Air (**3**)

Laboratory and Ambient Air Studies (**4-20**)

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1356. Other pertinent abbreviations and symbols are defined within this practice at point of use.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *absolute canister pressure*— $P_g + P_a$, where P_g = gage pressure in the canister. (KPa, psi) and P_a = barometric pressure (see 5.2).

3.2.2 *absolute pressure*—pressure measured with reference to absolute zero pressure (as opposed to atmospheric pressure), usually expressed as kPa, mm Hg, or psia.

3.2.3 *certification*—the process of demonstrating with humid zero air and humid calibration gases that the sampling systems components and the canister will not change the concentrations of sampled and stored atmospheres.

3.2.4 *cryogen*—a refrigerant used to obtain very low temperatures in the cryogenic trap of the analytical system. A typical cryogen is liquid argon (bp -185.7°C) or liquid nitrogen (bp -195°C).

3.2.5 *dynamic calibration*—calibration of an analytical system using calibration gas standard concentrations generated by diluting known concentration compressed gas standards with purified, humidified inert gas.

3.2.5.1 *Discussion*—Such standards are in a form identical or very similar to the samples to be analyzed. Calibration

¹ This test method is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

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² This test method is based on EPA Compendium Method TO-14, "The Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using SUMMA Passivated Canister Sampling and Gas Chromatographic Analysis," May 1988.

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

⁴ Annual Book of ASTM Standards, Vol 11.03.

⁵ Annual Book of ASTM Standards, Vol 14.02.