



Designation: ~~D6306~~—~~10~~ **D6306** – 17

Standard Guide for Placement and Use of ~~Diffusion-Controlled Passive Monitors~~ Diffusive Samplers for Gaseous Pollutants in Indoor Air¹

This standard is issued under the fixed designation D6306; 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 guide covers the placement and use of ~~diffusion-controlled monitors in the indoor atmosphere~~, diffusive samplers in an indoor environment.

1.2 The primary use of diffusive samplers is to measure the exposure concentrations of specific gaseous air contaminants for occupants in a variety of indoor environments.

1.3 ~~Diffusion-controlled passive monitors~~ Diffusive samplers within this guide include both area and personal monitors for use are used to measure concentrations of air contaminants in residences, public buildings, offices, and other non-industrial workplaces and dwelling environments. A ~~passive monitor~~ diffusive sampler is any air ~~monitor~~ sampler that does not utilize electrical or mechanical power in order to supply air to the sorbent media or chemical reactant within the ~~monitor~~ sampler and ~~sample that samples~~ according to Fick's ~~Fick's~~ first law of diffusion.

1.4 The purpose of this guide is to ensure uniformity of sampling within a variety of indoor environments and to facilitate comparison of results.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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~~ safety, health, and health 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:*²

[D1356 Terminology Relating to Sampling and Analysis of Atmospheres](#)

[D1357 Practice for Planning the Sampling of the Ambient Atmosphere](#)

~~[D4597 Practice for Sampling Workplace Atmospheres to Collect Gases or Vapors with Solid Sorbent Diffusive Samplers](#)~~

[D3614 Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions](#)

[D4840 Guide for Sample Chain-of-Custody Procedures](#)

[D6196 Practice for Choosing Sorbents, Sampling Parameters and Thermal Desorption Analytical Conditions for Monitoring Volatile Organic Chemicals in Air](#)

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminology [D1356](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *passive monitor*—~~a diffusion-controlled air monitor that does not utilize electrical or mechanical power in order to supply air to the sorbent media or chemical reactant within the monitor. These monitors may be worn by an individual (personal passive monitor) or used as sampling devices within specific locations (area passive monitor).~~

¹ This ~~method~~ guide 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 April 1, 2010/Oct. 1, 2017. Published April 2010/October 2017. Originally approved in 1998. Last previous edition approved in 2003/2010 as ~~D6306—98 (2003)~~ **D6306 – 10**. DOI: ~~10.1520/D6306-10~~ 10.1520/D6306-17.

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.

4. Summary of Guide

4.1 Contaminants in air are sampled by collection with a sorbent or chemically reactive medium in order to undergo subsequent analysis for determination of concentration. Contaminants in air are transported to the sorption medium or reacting chemical through vapor or gas diffusion. During the sampling process, the compounds, in a molecular state, diffuse from the environment adjacent to the sampler through a first region of defined geometric structure and into a second adsorbing region containing the sorbent. Samplers are resealed at the end of the exposure period and sent to a laboratory for analysis.

4.2 Guidance is provided for the placement, handling, and use of passive air monitors ~~diffusive samplers~~ within an indoor environment.

5. Significance and Use

5.1 Diffusive samplers provide a useful sampling option for studying time-weighted average indoor air concentrations of vapor-phase pollutants. They are easy and cost-effective to deploy enabling the collection of relatively large data sets.

5.2 The objective of this guide is to provide guidance for the placement and use of passive monitors ~~diffusive samplers~~ that when uniformly applied enables the user to eliminate many ~~interferences in the~~ potential interferences that may occur in diffusive sampling of indoor air. Since the analysis of the indoor environment by passive air monitors ~~diffusive sampling~~ is influenced by many factors other than the method of sampling, efforts are made to minimize interfering factors and maintain the air at conditions typical of the measurement location within the vicinity of the passive air monitor ~~diffusive sampler~~. However, when performing certain diagnostic or special measurements, non-typical indoor air environment ~~environmental~~ conditions may be desirable or required. Thus, the objectives of a sampling study ~~may determine the conditions needed for sampling.~~

5.3 Passive ~~Diffusive~~ sampling provides for time integrated measurements. Passive monitors ~~Diffusive samplers~~ are usually placed in an indoor environment over a time period to obtain a cumulative sample; time weighted average concentration; hence, interfering factors potentially occurring over this period should be anticipated and eliminated where possible. Passive monitors ~~Diffusive samplers~~ often lack the sensitivity to measure short-term peak concentrations.

5.4 With suitable instruction regarding placement of passive monitors, placement ~~diffusive samplers, placement,~~ and retrieval of the monitors ~~samplers~~ can be performed by unskilled personnel (for example, occupants).

6. General Principles

6.1 The choice of a passive monitor, diffusive sampler, characteristics of the sampling site, number of sampling points, sampling duration, number of monitors, samplers, and number of sampling periods depends on the objectives of the monitoring ~~sampling~~ program.

6.2 Passive monitors ~~Diffusive samplers~~ rely on air currents within an indoor environment for circulation of a representative sample atmosphere ~~to in~~ the vicinity of the monitor; sampler. Therefore, it is essential that air circulation in the vicinity of the sampler be sufficient to keep the boundary layer thin enough so that the analyte can diffuse across it, preventing a ~~maintain~~ representative ambient concentrations near the monitoring surface and prevent localized concentration depletion by the monitor. The adequacy of the sampling is directly influenced by the location and subsequent exposure of the monitor to a representative indoor atmosphere: sampler.

6.3 The objective of the study may affect the type of monitor ~~sampler~~ selected and the location of placement; its positioning. In general terms, Practice **D1357** will acquaint the user with established ~~overall~~ study considerations.

6.4 The study design typically needs to take into consideration a wide range of building operating parameters and conditions. The success of the study, in many cases, will depend upon controlling or quantifying key parameters such as building ventilation and occupancy as examples.

6.5 The following sections provide numerous recommendations for procedures, precautions, and other courses of action. Decisions regarding all of these actions are to be made based on the objectives of the study and its data quality requirements.

7. Sampling with Passive Monitors ~~Diffusive Samplers~~

7.1 Inspect the monitor ~~sampler~~ and package carefully. The monitor ~~sampler~~ or its protective packaging may have been damaged during shipment. ~~The~~ Depending on the type of sampler and its subsequent analysis, the user should not directly contact the ~~monitorsampler~~ with bare skin and, in no case, permit anything to contact the sampling face; opening or surface.

7.2 Calibration of the Passive Monitor—Sampling Time (Exposure Period)—Information relating to calibration may be found in Practice ~~Determine the required sampling time from the manufacturer's guidance and taking in to account the sampling rates published for~~ **D4597**. These documents also provide information relating to the determination of the required minimum sampling time: the specific target compounds. Determine if the associated analytical sensitivity will be sufficient given the study objectives and the expected air concentrations.

NOTE 1—Information relating to calibration of the system used for subsequent analysis is described separately, in relevant standards (for example, Practice **D6196**).

7.3 The sampling period begins when the lid, cover, or protective container of the ~~monitor~~sampler is removed to permit ~~sampling by the monitor~~air to enter the sampler. The starting date and time of the sampling period should be transcribed to a logbook or an appropriate form and on the ~~monitor~~sampler label. The writing instrument, for example, ~~markers, a marker~~, should not ~~provide the potential of~~be a source of potential contamination to the ~~monitor~~. ~~A sample~~. An adequate means of resealing or replacing the ~~monitor~~sampler lid or cover should be ensured. (See, for example, Practice [D6196](#).)

7.4 ~~The monitor~~Each sampler should have a permanently attached identification code or serial number that should be transcribed to a logbook or an appropriate form. The logbook should include information describing the location of ~~the monitor~~each sampler and pertinent information regarding the building and the deployment area, such as construction, type of heating system, insulation, occupancy number and patterns, and major appliance location. A room ~~deployment should additionally list location within the room: activities, general location of furnishings, possible sinks/sources, vents, and locations of major appliances, presence of possible sinks/sources, locations of air vents and air management systems, and other relevant features.~~ Include a diagram of the sampling location ~~and building, depicting the information listed in this subsection.~~locations in the building or study area, depicting the major features listed herein. If the occupant deploys the ~~monitor~~, ~~sufficient~~samplers, detailed instructions should be ~~included~~provided regarding proper location selection and sampling procedures. ~~A~~An organized form should be ~~included~~provided for easy collection of occupant ~~information necessary for logbook entries~~recorded information.

7.5 If the ~~monitor~~sampler is deployed for other than a screening measurement, the ~~monitor~~sampler should be placed by an experienced professional familiar with the ~~monitor~~used. For specific ~~diagnostic measurements~~, a deviation from the guidelines in this document is ~~permissible~~sampler used.

7.6 *Recovery of the Passive Monitor: Diffusive Sampler:*

7.6.1 The sampling or exposure period is terminated when the ~~monitor is sealed and removed from the sampling environment~~sampler is sealed so that air can no longer enter the sampler.

7.6.2 Record the time and date for measurement terminationdate and time of termination of sample collection in a logbook or on anyan appropriate form and on the monitor label. ~~Any damage to the monitor or variation in the monitor placement since deployment should be noted in the logbook or on any appropriate form.~~sampler label.

7.6.3 Adequate information should be entered into the logbook or an appropriate form to permit interpretation of results and comparison to similar measurements, ~~assessment of data quality and the interpretation of results~~. Any variation in the sampling location, building structure, or building systems should be ~~noted~~recorded.

7.6.4 The ~~monitor~~sampler should be analyzed within the time specifications of the specific ~~monitor~~sampler used.

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