



Designation: D6246 – 08 (Reapproved 2018)

Standard Practice for Evaluating the Performance of Diffusive Samplers¹

This standard is issued under the fixed designation D6246; 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 evaluation of the performance of diffusive samplers of gases and vapors for use over sampling periods from 4 to 12 h and for wind speeds less than 0.5 m/s. Such sampling periods and wind speeds are the most common in the indoor workplace setting. This practice does not apply to static or area sampling in wind speeds less than 0.1 m/s, when diffusion *outside* the sampler may dominate needed convection from the ambient air to the vicinity of the sampler. Given a suitable exposure chamber, the practice can be extended to cover sampler use for other sampling periods and conditions. The aim is to provide a concise set of experiments for classifying samplers primarily in accordance with a single sampler accuracy figure. Accuracy is defined (3.2.2) in this standard so as to take into account both imprecision and uncorrected bias. Accuracy estimates refer to conditions of sampler use which are normally expected in a workplace setting. These conditions may be characterized by the temperature, atmospheric pressure, humidity, and ambient wind speed, none of which may be constant or accurately known when the sampler is used in the field. Furthermore, the accuracy accounts for the effects of diffusive loss of analyte on the estimation of time-weighted averages of concentrations which may not be constant in time. Aside from accuracy, the samplers are tested for compliance with the manufacturer's stated limits on capacity, possibly in the presence of interfering compounds.

1.2 This practice is an extension of previous research on diffusive samplers (1-14)² as well as Practices D4597, D4598, D4599, and MDHS 27. An essential advance here is the estimation of sampler accuracy under actual conditions of use. Furthermore, the costs of sampler evaluation are reduced.

1.3 Knowledge gained from similar analytes expedites sampler evaluation. For example, interpolation of data characterizing the sampling of analytes at separated points of a homologous series of compounds is recommended. At present

the procedure of (9) is suggested. Following evaluation of a sampler in use at a single homologous series member according to the present practice, higher molecular weight members would receive partial validations considering sampling rate, capacity, analytical recovery, and interferences. The test for diffusive analyte loss can be omitted if the effect is found negligible for a given sampler or analyte series.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *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

D4597 Practice for Sampling Workplace Atmospheres to Collect Gases or Vapors with Solid Sorbent Diffusive Samplers

D4598 Practice for Sampling Workplace Atmospheres to Collect Gases or Vapors with Liquid Sorbent Diffusional Samplers (Withdrawn 1995)⁴

D4599 Practice for Measuring the Concentration of Toxic Gases or Vapors Using Length-of-Stain Dosimeters

2.2 International Standards:

CEN EN 838 European Standard, Workplace Atmospheres – Diffusive Samplers for the Determination of Gases or

¹ This practice is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.04 on Workplace Air Quality.

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² The boldface numbers in parentheses refer to the 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.