



Standard Practice for Measuring the Concentration of Toxic Gases or Vapors Using Length-of-Stain Dosimeters¹

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1. Scope

1.1 This practice describes the detection and measurement of time weighted average (TWA) concentrations of toxic gases or vapors using length-of-stain colorimetric dosimeter tubes. A list of some of the gases and vapors that can be detected by this practice is provided in **Annex A1**. This list is given as a guide and should be considered neither absolute nor complete.

1.2 Length-of-stain colorimetric dosimeters work by diffusional sampling. The results are immediately available by visual observation; thus no auxiliary sampling, test, nor analysis equipment are needed. The dosimeters, therefore, are extremely simple to use and very cost effective.

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

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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

2.2 *Other Document:*³

U.S. Occupational Safety and Health Standard—Title 29 1910.1000 Subpart Z

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 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.

³ Code of Federal Regulations, available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology **D1356**.

4. Summary of Practice

4.1 Length-of-stain colorimetric dosimeters consist of a sealed glass tube containing a detector inside the tube **(1-5)**.⁴ The detector is a length of granulated material impregnated with a reactive chemical that is sensitive to the particular gas for which the dosimeter is designed. To use the tube, one end is opened. The gas, if present, diffuses into the tube and reacts with the chemical reagent on the carrier material, causing the latter to change color. Each lot of dosimeters is individually calibrated so that by measuring the length of stain and the time of exposure, the TWA concentration to which the dosimeter has been exposed can be measured directly and immediately.

4.2 Information on the correct use of length of stain dosimeter tubes is presented.

5. Significance and Use

5.1 The U.S. Occupational Safety and Health Administration (OSHA) in 29 CFR 1910.1000 Subpart Z designates that certain gases and vapors present in work place atmospheres must be controlled so that their concentrations do not exceed specified limits. Other countries have similar regulations.

5.2 This practice will provide a means for the measurement of airborne concentrations of certain gases and vapors listed in 29 CFR 1910.1000 and in other countries' regulations.

5.3 A partial list of chemicals for which this practice is applicable is presented in **Annex A1** with current Threshold Limit Values (TLV)⁵ **(2)** and typical measurement ranges for the selected chemicals as obtained from various manufacturer's specifications.

5.4 This practice may be used for either personal or area monitoring.

⁴ The boldface numbers in parentheses refer to the list of references appended to this practice.

⁵ Threshold Limit Values (TLV) is a registered trademark of the American Conference of Governmental Industrial Hygienists (ACGIH).