



Designation: D6889 – 03 (Reapproved 2024)

Standard Practice for Fast Screening for Volatile Organic Compounds in Water Using Solid Phase Microextraction (SPME)¹

This standard is issued under the fixed designation D6889; 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 a procedure for the screening of trace levels of volatile organic compounds in water samples by headspace solid phase microextraction (SPME) in combination with fast gas chromatography with flame ionization detection.

1.2 The results from this screening procedure are used to estimate analyte concentrations to prevent contamination of purge and trap or headspace analytical systems.

1.3 The compounds of interest must have a greater affinity for the SPME absorbent polymer or adsorbent than the sample matrix or headspace phase in which they reside.

1.4 Not all of the analytes which can be determined by SPME are addressed in this practice. The applicability of the absorbent polymer, adsorbent or combination to extract the compound(s) of interest must be demonstrated before use.

1.5 Where used it is the responsibility of the user to validate the application of SPME to the analytes of interest.

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

1.7 *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. For specific hazard statements, see Section 9.*

1.8 *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.*

¹ This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.06 on Methods for Analysis for Organic Substances in Water.

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2. Referenced Documents

2.1 ASTM Standards:²

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D3694 Practices for Preparation of Sample Containers and for Preservation of Organic Constituents

D3856 Guide for Management Systems in Laboratories Engaged in Analysis of Water (Withdrawn 2024)³

D4210 Practice for Intralaboratory Quality Control Procedures and a Discussion on Reporting Low-Level Data (Withdrawn 2002)³

D6520 Practice for the Solid Phase Micro Extraction (SPME) of Water and its Headspace for the Analysis of Volatile and Semi-Volatile Organic Compounds

3. Summary of Practice

3.1 This practice employs adsorbent/gas extraction to isolate compounds of interest, see Practice D6520. An aqueous sample is added to a small (2 mL) septum-sealed vial. Salt is used to improve analyte recovery. After the addition of a surrogate standard and a short mixing cycle, a SPME fused silica fiber coated with a thick polymer film is then exposed to the aqueous headspace for a few seconds. The fiber is then desorbed in the heated injection port of a gas chromatography/flame ionization detector (GC/FID) or gas chromatography/mass spectrometry (GC-MS) and the resulting analytes chromatographed on a short narrow bore capillary column. The total analysis time is approximately 3 min.

3.2 The concentrations of the volatile organics in the water sample are estimated to determine whether the sample may be analyzed directly or first diluted prior to purge and trap or headspace analysis.

4. Significance and Use

4.1 This practice provides a general procedure for the SPME of volatile organic compounds from the headspace of an

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 The last approved version of this historical standard is referenced on www.astm.org.