



Designation: D4856 – 99 (Reapproved 2004)

Standard Test Method for Determination of Sulfuric Acid Mist in the Workplace Atmosphere (Ion Chromatographic)¹

This standard is issued under the fixed designation D4856; 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 ion chromatographic test method describes the determination of sulfuric acid mist in air samples collected from workplace atmospheres in a three-piece cassette filter.

1.2 The lower detection limit of this test method is 0.017 mg/m³ of sulfuric acid (H₂SO₄) mist in 60 L of air sampled at 1 L/min.

1.3 This test method is relatively free from interference. The only known interference is soluble or partially soluble sulfate salts.

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.* For specific precautionary statements, see Section 9.

2. Referenced Documents

2.1 *ASTM Standards:*²

D1193 Specification for Reagent Water

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D1357 Practice for Planning the Sampling of the Ambient Atmosphere

D1605 Practices for Sampling Atmospheres for Analysis of Gases and Vapors³

D1914 Practice for Conversion Units and Factors Relating to Sampling and Analysis of Atmospheres

D4327 Test Method for Anions in Water by Chemically Suppressed Ion Chromatography

¹ This test method is under the jurisdiction of ASTM Committee D22 on Sampling Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.04 on Workplace Atmospheres.

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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³ Withdrawn.

E200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *eluent*—ionic mobile phase used to transport the sample through the exchange columns.

3.2.2 *resolution*—ability of a column to separate constituents under specified test conditions.

4. Summary of Test Method

4.1 A known volume of air is drawn through a cassette filter holder containing a 37-mm mixed cellulose ester membrane filter of 0.8- μ m pore size. The filter is held in a 3-piece cassette supported by a cellulose back-up pad.⁴

4.2 The filter is desorbed with Specification D1193 Type 1 water and an aliquot of the desorbed sample is injected into an ion chromatograph. The sample is pumped through two different ion exchange columns into a conductivity detector. Those columns are a precolumn and separator column which are packed with low-capacity anion exchanger. Ions are separated based on their affinity for the exchange sites of the resin. A method for anion suppression is used to reduce background conductivity of the eluent.

5. Significance and Use

5.1 Sulfuric acid is used in the manufacture of fertilizer, explosives, dyestuffs, other acids, parchment paper, glue, and the pickling of metal.

5.2 This test method has been found satisfactory for measuring sulfuric acid at levels required by federal occupational health regulations.

6. Interferences

6.1 Soluble or partially soluble sulfate salts, for example, sodium or calcium sulfate, will constitute a positive bias.

⁴ Precision ($CV_T = 0.082$) was obtained from NIOSH Contract No. CDC-99-74-45 on a range of 0.561 – 2.577 mg/M³ using cellulose ester filters.