



Designation: D 3449 - 79 (Reapproved 1984)

Standard Test Method for SULFUR DIOXIDE IN WORKPLACE ATMOSPHERES (BARIUM PERCHLORATE METHOD)¹

This standard is issued under the fixed designation D 3449; 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.

This method has been approved for use by agencies of the Department of Defense and for listing in the DoD Index of Specifications and Standards.

1. Scope

1.1 This method² is used to determine sulfur dioxide in workplace atmospheres. It is specific for SO₂ if precautions are taken to remove interfering particles and mists (1), (2), (3), (4), and (5).³ Special care must be given to training analysts to determine the end point.

1.2 The method is sensitive to 0.1 mg/m³ of sulfur dioxide in a 100-litre air sample, or about 0.25 ppm SO₂ in air. The upper limit is the amount of SO₂ absorbed in the hydrogen peroxide reagent and is at least 5 mg.

1.3 This method is less sensitive than the one by West-Gaeke for ambient air and can be more difficult to operate. However, this method has ample sensitivity for workplace atmosphere concentrations of SO₂ and with a minimum of operator training, the analysis can be rapid and simple.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. (For more specific safety precautions see 9.1.)*

2. Applicable Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water⁴

D 1356 Definitions of Terms Relating to Atmospheric Sampling and Analysis⁵

D 1357 Practice for Planning the Sampling of the Ambient Atmosphere⁵

D 1605 Recommended Practices for Sampling Atmospheres for Analysis of Gases and Vapors⁵

3. Summary of Method

3.1 A known volume of air is drawn through a midjet impinger containing 15 ml of 0.3 N hydrogen peroxide. The sulfur dioxide present is oxidized to sulfate and then titrated with 0.005 M barium perchlorate solution using thorin as the indicator. There is a change from yellow to pink at the end point.

4. Significance and Use

4.1 The samples taken by this method can be made free from common interferences and are also stable and nonvolatile, making this manner of collection desirable. The analysis is relatively rapid and simple.

5. Definitions

5.1 For definitions of terms used in this method, refer to Definitions D 1356.

¹ This method is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres, and is the direct responsibility of Subcommittee D22.04 on Analysis of Work Space Atmospheres.

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² This method is an adaptation of one developed by J.S. Fritz and S.S. Yamamura of the Institute for Atomic Research and Department of Chemistry, Iowa State College.

³ The boldface numbers in parentheses refer to a list of references at the end of this method.

⁴ *Annual Book of ASTM Standards*, Vol 11.01.

⁵ *Annual Book of ASTM Standards*, Vol 11.03.

⁶ Millipore or Nuclepore membrane filters have been used successfully and are available from Millipore Corporation, 80 Ashby Road, Bedford, MA 01730.