



Standard Test Methods for Sulfur Dioxide Content of the Atmosphere (West-Gaeke Method)¹

This standard is issued under the fixed designation D2914; 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 standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods cover the bubbler collection and colorimetric determination of sulfur dioxide (SO_2) in the ambient or workplace atmosphere.

1.2 These test methods are applicable for determining SO_2 over the range from approximately $25 \mu\text{g}/\text{m}^3$ (0.01 ppm(v)) to $1000 \mu\text{g}/\text{m}^3$ (0.4 ppm(v)), corresponding to a solution concentration of $0.03 \mu\text{g SO}_2/\text{mL}$ to $1.3 \mu\text{g SO}_2/\text{mL}$. Beer's law is followed through the working analytical range from $0.02 \mu\text{g SO}_2/\text{mL}$ to $1.4 \mu\text{g SO}_2/\text{mL}$.

1.3 The lower limit of detection is $0.075 \mu\text{g SO}_2/\text{mL}$ (**1**),² representing an air concentration of $25 \mu\text{g SO}_2/\text{m}^3$ (0.01 ppm(v)) in a 30-min sample, or $13 \mu\text{g SO}_2/\text{m}^3$ (0.005 ppm(v)) in a 24-h sample.

1.4 These test methods incorporate sampling for periods between 30 min and 24 h.

1.5 These test methods describe the determination of the collected (impinged) samples. A Method A and a Method B are described.

1.6 Method A is preferred over Method B, as it gives the higher sensitivity, but it has a higher blank. Manual Method B is pH-dependent, but is more suitable with spectrometers having a spectral band width greater than 20 nm.

NOTE 1—These test methods are applicable at concentrations below $25 \mu\text{g}/\text{m}^3$ by sampling larger volumes of air if the absorption efficiency of the particular system is first determined, as described in **Annex A4**.

NOTE 2—Concentrations higher than $1000 \mu\text{g}/\text{m}^3$ can be determined by using smaller gas volumes, larger collection volumes, or by suitable dilution of the collected sample with absorbing solution prior to analysis.

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

¹ These test methods are under the jurisdiction of ASTM Committee D22 on Air Quality and are the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.

1.8 **Warning**—Mercury has been designated by many regulatory agencies as a hazardous material that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Safety Data Sheet (SDS) for additional information. Users should be aware that selling mercury and/or mercury containing products into your state or country may be prohibited by law.

1.9 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 8.3.1, Section 9, and A3.1.3.

2. Referenced Documents

2.1 ASTM Standards:³

- D1193 Specification for Reagent Water
- D1356 Terminology Relating to Sampling and Analysis of Atmospheres
- D1357 Practice for Planning the Sampling of the Ambient Atmosphere
- D1914 Practice for Conversion Units and Factors Relating to Sampling and Analysis of Atmospheres
- D3195 Practice for Rotameter Calibration
- D3609 Practice for Calibration Techniques Using Permeation Tubes
- D3631 Test Methods for Measuring Surface Atmospheric Pressure
- E1 Specification for ASTM Liquid-in-Glass Thermometers
- E2251 Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids
- E275 Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

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.