Designation: D 2914 – 01

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

This standard is issued under the fixed designation D 2914; 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 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 $\mu g/m^3$ (0.01 ppm(v)) to 1000 $\mu g/m^3$ (0.4 ppm(v)), corresponding to a solution concentration of 0.03 μg SO_2/mL to 1.3 μg SO_2/mL. Beer's law is followed through the working analytical range from 0.02 μg SO_2/mL to 1.4 μg SO_2/mL.

1.3 The lower limit of detection is 0.075 μg SO_2/mL **(1)**[2], representing an air concentration of 25 μg SO_2/m^3 (0.01 ppm(v)) in a 30–min sample, or 13 μg SO_2/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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 *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 A3.1.1.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1071 Test Methods for Volumetric Measurement of Gaseous Fuel Samples[2]

D 1193 Specification for Reagent Water[3]

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres[4]

D 1357 Practice for Planning the Sampling of the Ambient Atmosphere[4]

D 1605 Practices for Sampling Atmospheres for Analysis of Gases and Vapors[5]

D 1914 Practice for Conversion Units and Factors Relating to Sampling and Analysis of Atmospheres[4]

D 3195 Practice for Rotameter Calibration[4]

D 3609 Practice for Calibration Techniques Using Permeation Tubes[4]

D 3631 Test Methods for Measuring Surface Atmospheric Pressure[4]

E 1 Specification for ASTM Thermometers[6]

E 275 Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near-Infrared Spectrophotometers[7]

2.2 *Other Standards:*

40 CFR Part 58 Probe and Monitoring Path Siting Criteria from Ambient Air Quality Monitoring, Appendix E[8]

3. Terminology

3.1 For definitions of terms used in this method, refer to Terminology D 1356.

4. Summary of Test Methods

4.1 Sulfur dioxide (SO_2) is absorbed by aspirating a measured air sample through a tetrachloromercurate (TCM) solution, resulting in the formation of a dichlorosulfonatomercurate

[1] These test methods are under the jurisdiction of ASTM Committee D22 on Sampling and Analysis of Atmospheres and are the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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[2] *Annual Book of ASTM Standards*, Vol 05.06.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] *Annual Book of ASTM Standards*, Vol 11.03.

[5] *Discontinued*—See *1991 Annual Book of ASTM Standards*, Vol 11.03.

[6] *Annual Book of ASTM Standards*, Vol 14.03.

[7] *Annual Book of ASTM Standards*, Vol 03.06.

[8] Available from U.S Government Printing Office, Superintendent of Documents, 732 North Capitol Street, NW, Mail Stop: SDE, Washington, DC 20401.

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