



Designation: D5156 – 22

Standard Test Methods for Continuous Measurement of Ozone in Ambient, Workplace, and Indoor Atmospheres (Ultraviolet Absorption)¹

This standard is issued under the fixed designation D5156; 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 test method describes the sampling and continuous analysis of ozone (O_3) in the atmosphere at concentrations ranging from 10 to 2000 $\mu\text{g}/\text{m}^3$ of O_3 in air (5 ppb(v) to 1 ppm(v)).

1.1.1 The test method is limited to applications by its sensitivity to interferences as described in Section 6. The interference sensitivities may limit its use for ambient and workplace atmospheres.

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

1.3 *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.*

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

- 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

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

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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.

D3249 Practice for General Ambient Air Analyzer Procedures

D3631 Test Methods for Measuring Surface Atmospheric Pressure

D3670 Guide for Determination of Precision and Bias of Methods of Committee D22

D5011 Practices for Calibration of Ozone Monitors Using Transfer Standards

D5110 Practice for Calibration of Ozone Monitors and Certification of Ozone Transfer Standards Using Ultraviolet Photometry

IEEE/ASTM SI-10 Practice for Use of the International System of Units (SI) (the Modernized Metric System)

2.2 Other Documents:

EPA-600/4-76-005 *Quality Assurance Handbook for Air Pollution Measurement Systems*, Vol I, "Principles"³

EPA-600/4-77-027a *Quality Assurance Handbook for Air Pollution Measurement Systems*, Vol II, "Ambient Air Specific Methods"³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D1356. An explanation of units, symbols, and conversion factors may be found in Practice IEEE/ASTM SI-10.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *absolute ultraviolet photometer*—a photometer whose design, construction, and maintenance is such that it can measure the absorbance caused by O_3 mixtures without reference to external absorption standards. Given a value for the absorption coefficient of O_3 at 253.7 nm and a reading from the absolute ultraviolet photometer, O_3 concentrations can be calculated with accuracy. An absolute ultraviolet photometer is used only on prepared O_3 mixtures free from interferences, as in calibration activity.

3.2.2 *primary standard*—a standard directly defined and established by some authority, against which all secondary standards are compared.

³ Available from National Technical Information Service (NTIS), 5301 Shawnee Rd., Alexandria, VA 22312, <http://www.ntis.gov>.