



Designation: D3824 – 20

Standard Test Methods for Continuous Measurement of Oxides of Nitrogen in the Ambient or Workplace Atmosphere by Chemiluminescence¹

This standard is issued under the fixed designation D3824; 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 These test methods cover procedures for the continuous determination of total nitrogen dioxide (NO₂) and nitric oxide (NO) as NO_x, or nitric oxide (NO) alone or nitrogen dioxide (NO₂) alone, in the ranges shown in the following table:

Approximate Range of Concentration
(25°C and 101.3 kPa (1 atm))

Gas	Ambient Atmosphere μg/m ³ (ppm)	Workplace Atmosphere mg/m ³ (ppm)
NO	10 to 600 (0.01 to 0.5)	0.6 to 30 (0.5 to 25)
(NO + NO ₂) = NO _x	20 to 1000 (0.01 to 0.05)	1 to 50 (0.5 to 25)
NO ₂	20 to 1000 (0.01 to 0.5)	1 to 50 (0.5 to 25)

1.2 The test methods are based on the chemiluminescent reaction between nitric oxide and ozone.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. For specific precautionary statements, see Section 9.*

1.5 *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

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 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.

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/D3195M Practice for Rotameter Calibration

D3249 Practice for General Ambient Air Analyzer Procedures

D3609 Practice for Calibration Techniques Using Permeation Tubes

D3631 Test Methods for Measuring Surface Atmospheric Pressure

2.2 Other Documents:

29 CFR Part 1910, Occupational Safety and Health Standards³

40 CFR Parts 50 and 53, Environmental Protection Agency Regulations on Ambient Air Monitoring Reference and Equivalent Methods³

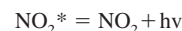
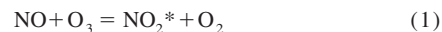
3. Terminology

3.1 Definitions:

3.1.1 Four definitions of terms used in these test methods, refer to Terminology D1356 and Practice D3249.

4. Summary of Test Methods

4.1 The principle of the methodology is based upon the chemiluminescence, or the emission of light, resulting from the homogeneous gas phase reaction of nitric oxide and ozone (**1**).⁴ The equation is as follows:



In the presence of excess ozone, the intensity of the light emission is directly proportional to the nitric oxide concentration.

³ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, http://www.access.gpo.gov.

⁴ The boldface numbers in parentheses refer to a list of references at the end of this standard.