



Designation: D6522 – 20

Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas- Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers¹

This standard is issued under the fixed designation D6522; 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 covers the determination of nitrogen oxides (NO and NO_2), carbon monoxide (CO), and oxygen (O_2) concentrations in controlled and uncontrolled emissions from natural gas-fired reciprocating engines, combustion turbines, boilers, and process heaters using portable analyzers with electrochemical sensors. Due to the inherent cross sensitivities of the electrochemical cells, this test method should not be applied to other pollutants or emission sources without a complete investigation of possible analytical interferences and a comparative evaluation with EPA test methods.

1.1.1 The procedures and specifications of this test method were originally developed during laboratory and field tests funded by the Gas Research Institute (GRI).² Comparative emission tests were conducted only on natural gas-fired combustion sources. Subsequently, the U.S. Environmental Protection Agency (EPA) sponsored Environmental Technology Verification (ETV) program conducted further evaluations of electrochemical cell analyzers, which included laboratory tests and field tests on natural gas and diesel-fueled generators. The EPA has reviewed the ETV test results, published additional information, and provided technical input that has been considered in the update of this test method.³

1.2 This test method contains notes that are explanatory and are not part of the mandatory requirements of the standard.

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

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:⁴

[D1356 Terminology Relating to Sampling and Analysis of Atmospheres](#)

2.2 EPA Methods from 40 CFR Part 60, Appendix A:⁵

[Method 3A Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources \(Instrumental Analyzer Procedure\)](#)

[Method 7E Determination of Nitrogen Oxides Emissions from Stationary Sources \(Instrumental Analyzer Procedure\)](#)

[Method 10 Determination of Carbon Monoxide Emissions from Stationary Source](#)

[Method 20 Determination of Nitrogen Oxides, Sulfur Dioxide, and Diluent Emissions from Stationary Gas Turbines](#)

2.3 EPA Methods from 40 CFR Part 63, Appendix A:⁵

[Method 301 Field Validation of Pollutant Measurement Methods from Various Waste Media](#)

¹ This test method is 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 Juneau, P. Peeler, J. W., “Development of an Electrochemical Cell Emission Analyzer Test Method,” Gas Research Institute Topical Report prepared by Emission Monitoring Inc., GRI-96/0008, July 1997.

³ Shanklin, S., Wesson, K., and Kellar, P., “Evaluation of Portable Analyzers for Use in Quality Assuring Predictive Emission Monitoring Systems for NO_x ,” prepared by The Cadmus Group, EPA Contract No. 68-W-03-033, September 2004.

⁴ 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.

⁵ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.