



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 D 6522; 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. 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 method were 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.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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 and health practices and to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres³

2.2 EPA Methods from 40 CFR Part 60, Appendix A⁴

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 A⁴

Method 301 - Field Validation of Pollutant Measurement Methods from Various Waste Media

2.4 EPA Methods from 40 CFR Part 75, Appendix H⁴

Revised Traceability Protocol No. 1: Protocol G1 and G2 Procedures

3. Terminology

3.1 For terminology relevant to this test method, see Terminology D 1356.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *measurement system, n*—total equipment required for the determination of gas concentration. The measurement system consists of the following major subsystems:

3.2.1.1 *data recorder, n*—a strip chart recorder, computer, or digital recorder for recording measurement data.

3.2.1.2 *electrochemical cell, n*—that portion of the system that senses the gas to be measured and generates an output proportional to its concentration, or any cell that uses diffusion-limited oxidation and reduction reactions to produce an electrical potential between a sensing electrode and a counter electrode.

3.2.1.3 *external interference gas scrubber, n*—tube filled with scrubbing agent used to remove interfering compounds upstream of some electrochemical cells.

3.2.1.4 *sample interface, n*—that portion of a system used for one or more of the following: sample acquisition, sample transport, sample conditioning, or protection of the electrochemical cells from particulate matter and condensed moisture.

¹ This test method is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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² Gas Research Institute Topical Report, "Development of an Electrochemical Cell Emission Analyzer Test Method," GRI-96/0008, July 1997.

³ *Annual Book of ASTM Standards*, Vol 11.03.

⁴ Available from Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.