



Standard Guide for Testing Systems for Measuring Dynamic Responses of Carbon Monoxide Detectors to Gases and Vapors¹

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1. Scope

1.1 This guide describes testing systems used for measuring responses of carbon monoxide (CO) alarms or detectors subjected to gases, vapors, and their mixtures.

1.2 The systems are used to evaluate responses of CO detectors to various CO concentrations, to verify that the detectors alarm at certain specified CO concentrations, and to verify that CO detectors do not alarm at certain other specified CO concentrations.

1.3 The systems are used for evaluating CO detector responses to gases and vapors that may interfere with the ability of detectors to respond to CO.

1.4 Major components of such a testing system include a chamber, clean air supply module, humidification module, gas and vapor delivery module, and verification and control instrumentation.

1.5 For each component, this guide provides a comparison of different approaches and discusses their advantages and disadvantages.

1.6 The guide also presents recommendations for a minimum configuration of a testing system.

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

1.8 *This guide 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 more specific safety precautionary information, see 6.2.

¹ This guide is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

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2. Referenced Documents

2.1 *ASTM Standards*:²

- D1193 Specification for Reagent Water
 - D1356 Terminology Relating to Sampling and Analysis of Atmospheres
 - D1945 Test Method for Analysis of Natural Gas by Gas Chromatography
 - D3162 Test Method for Carbon Monoxide in the Atmosphere (Continuous Measurement by Nondispersive Infrared Spectrometry)
 - D3195 Practice for Rotameter Calibration
 - D3249 Practice for General Ambient Air Analyzer Procedures
 - D3687 Practice for Analysis of Organic Compound Vapors Collected by the Activated Charcoal Tube Adsorption Method
- ### 2.2 *Other Standards*:
- UL 2034 Single and Multiple Station Carbon Monoxide Alarms³
 - CFR 1910.1450 Occupational Exposure to Hazardous Chemicals in Laboratories⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, refer to Terminology D1356.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *air change rate*—the volume of clean, humidified air plus contaminants that enters the chamber in 1 h, divided by the internal volume of the chamber, expressed as air changes per hour (h^{-1}).

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.

³ Available from Underwriters Laboratories (UL), 2600 N.W. Lake Rd., Camas, WA 98607-8542, <http://www.ul.com>.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.