



Designation: D8405 – 21

Standard Test Method for Evaluating PM_{2.5} Sensors or Sensor Systems Used in Indoor Air Applications¹

This standard is issued under the fixed designation D8405; 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 uses a chamber system to evaluate the performance of stationary PM_{2.5} sensors (sensors) and particle sensor systems (sensor systems) subjected to various test conditions, including temperature, relative humidity, PM_{2.5} concentration, and coarse PM interferent concentration.

1.1.1 This test method covers sensors and sensor systems that can be continuously powered and continuously operated for the duration of any test described in this method through line power or an internal battery of sufficient output. This test method is not meant to evaluate sensors or sensor systems without these capabilities.

1.1.2 This test method evaluates the performance of sensors and sensor systems that allow users to collect data in a systemic manner to assess the capabilities and limitations of these devices.

1.1.3 This test method is not meant to evaluate sensors or sensor systems without data storage and recording capabilities.

1.1.4 This test method is not intended to evaluate indoor air quality sensors and sensor systems for purposes of regulation of outdoor air, homeland security, law enforcement or forensic activity.

1.2 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.

1.3 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the 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 standard-*

ization 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

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

D6330 Practice for Determination of Volatile Organic Compounds (Excluding Formaldehyde) Emissions from Wood-Based Panels Using Small Environmental Chambers Under Defined Test Conditions

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E3080 Practice for Regression Analysis with a Single Predictor Variable

2.2 International Standards Organization (ISO) Standards:³

ISO 8573-1 Requirements for the purity of compressed air with respect to particles, water, and oil

ISO 12103-1 Road vehicles — Test contaminants for filter evaluation — Part 1: Arizona test dust

ISO 17025 General requirements for the competence of testing and calibration laboratories

2.3 United States (U.S.) Code of Federal Regulations (CFR):⁴

Title 40 Part 53 Requirements for ambient particulate instruments to attain U.S. Environmental Protection Agency (EPA) Federal Equivalent Method (FEM) designations

Title 40 Part 58 Terminology relating to particulate matter fractions

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 International Organization for Standardization (ISO), ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <https://www.iso.org>.

⁴ Available from U.S. Government Publishing Office (GPO), 732 N. Capitol St., NW, Washington, DC 20401, <http://www.gpo.gov>.

¹ This test method 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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