



Designation: D7439 – 21

## Standard Test Method for Determination of Elements in Airborne Particulate Matter by Inductively Coupled Plasma–Mass Spectrometry<sup>1</sup>

This standard is issued under the fixed designation D7439; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method specifies a procedure for sample preparation and analysis of airborne particulate matter for the content of metals and metalloids in workplace air samples using inductively coupled plasma–mass spectrometry (ICP-MS). This test method can be used for other air samples provided the user ensures the validity of the test method (by ensuring that appropriate data quality objectives can be achieved).

1.2 This test method assumes that samples will have been collected in accordance with Test Method [D7035](#) with consideration of guidance regarding wall deposits provided in Guide [D8358](#).

1.3 This test method should be used by analysts experienced in the use of ICP-MS, the interpretation of spectral and matrix interferences and procedures for their correction.

1.4 This test method specifies a number of alternative methods for preparing test solutions from samples of airborne particulate matter. One of the specified sample preparation methods is applicable to the measurement of soluble metal or metalloid compounds. Other specified methods are applicable to the measurement of total metals and metalloids.

1.5 It is the user's responsibility to ensure the validity of this test method for samples collected from untested matrices.

1.6 [Table 1](#) provides a non-exclusive list of metals and metalloids for which one or more of the sample dissolution methods specified in this document is applicable.

1.7 This test method is not applicable to compounds of metals and metalloids that are present in the gaseous or vapor state.

1.8 [Table 3](#) provides examples of instrumental detection limits (IDL) that can be achieved with this test method. [Table 5](#) provides examples of method detection limits (MDL) that can be achieved.

1.9 No detailed operating instructions are provided because of differences among various makes and models of suitable ICP-MS instruments. Instead, the analyst shall follow the instructions provided by the manufacturer of the particular instrument. This test method does not address comparative accuracy of different devices or the precision between instruments of the same make and model.

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

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

1.12 *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.*

1.13 *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:*<sup>2</sup>

[D1193](#) Specification for Reagent Water

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

[D4185](#) Test Method for Measurement of Metals in Workplace Atmospheres by Flame Atomic Absorption Spectrophotometry

[D4840](#) Guide for Sample Chain-of-Custody Procedures

[D5011](#) Practices for Calibration of Ozone Monitors Using Transfer Standards

[D6785](#) Test Method for Determination of Lead in Workplace

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D22](#) on Air Quality and is the direct responsibility of Subcommittee [D22.04](#) on Workplace Air Quality.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.