



Standard Practice for Separation of Beryllium from Other Metals in Digestion and Extraction Solutions from Workplace Dust Samples¹

This standard is issued under the fixed designation D7441; 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 practice covers the separation of beryllium from other metals and metalloids in acid solutions, by extraction chromatography, for subsequent determination of beryllium by atomic spectroscopy techniques such as inductively coupled plasma atomic emission spectroscopy (ICP-AES).

1.2 This practice is applicable to samples of settled dust that have been collected in accordance with Practices **D6966** or **D7296**.

1.3 This practice is compatible with a wide variety of acid digestion techniques used in digesting settled dust samples, such as those described in Test Method **D7035**.

1.4 This practice is appropriate for the preparation of settled dust samples where an unacceptable bias is suspected or known because of spectral interferences caused by other metals or metalloids present in the sample. This practice may also be appropriate for the analysis of other types of samples.

1.5 *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 determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D1193 Specification for Reagent Water

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D6966 Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals

D7035 Test Method for Determination of Metals and Met-

alloids in Airborne Particulate Matter by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

D7296 Practice for Collection of Settled Dust Samples Using Dry Wipe Sampling Methods for Subsequent Determination of Beryllium and Compounds

E882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory

3. Terminology

3.1 For discussion of pertinent terms not discussed here, see Terminology **D1356**.

3.2 *Definitions:*

3.2.1 *digestion*—dissolution using a combination of acids and other reagents of solid materials into solution for subsequent instrumental analysis.

3.2.2 *eluate*—the effluent from a chromatography or resin column.

3.2.3 *extraction chromatography*—liquid chromatography applied to the separation of metal ions utilizing selective organic extractants as the stationary phase and the aqueous solution as the mobile phase (**1**)³.

3.2.3.1 *Discussion*—Extraction chromatography resins consist of inert porous beads coated with selective extractants.

3.2.4 *spectral interference*—an interference caused by the emission from a species other than the analyte of interest.

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3.2.5 *surface wipe*—refers either to a wetted wipe, as defined in Practice **D6966**, or to a dry wipe, as defined in Practice **D7296**, used to gather material from a surface for subsequent analysis.

3.2.5.1 *Discussion*—The terms wipe sampling, swipe sampling, and smear sampling describe the techniques used to assess surface contamination on the skin, work surfaces, and PPE surfaces (for example, gloves, respirators, aprons, etc.)

3.2.6 *vacuum box*—container used to maintain a vacuum on a resin or column sample in order to increase the rate of flow

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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 The boldface numbers in parentheses refer to a list of references at the end of this standard.