



Designation: D8299 – 19

Standard Guide for Using Metal Ratios in Soils to Distinguish Between Anthropogenic and Natural Beryllium¹

This standard is issued under the fixed designation D8299; 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 guide describes a general approach to planning investigations in which the goal is to obtain background measurements of naturally occurring Beryllium (N-Be) along with one or more predictor metals in local soils, to be used in predicting the amount of N-Be expected in samples taken for evaluation using the Metal Ratio Method (MRM). Generally, systematic random sampling is recommended, after which the results are interpreted using statistical methods described in this guide.

1.2 The total Be (T-Be) measured in evaluation samples can then be compared with the predicted N-Be to estimate the amount of anthropogenic Be (A-Be) present, if any. Several scenarios are discussed in which samples taken and analyzed for T-Be for worker or public protection purposes might include both N-Be and A-Be (see 6.1). This method can allow the N-Be and A-Be components of T-Be measurements to be estimated.

1.3 Values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this guide may be applicable in all circumstances. This ASTM standard guide is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

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 appro-*

priate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.6 *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:*²

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D7458 Test Method for Determination of Beryllium in Soil, Rock, Sediment, and Fly Ash Using Ammonium Bifluoride Extraction and Fluorescence Detection

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of common technical terms used in this standard, refer to Terminology **D653**.

4. Summary of Guide

4.1 This guide describes a Metal Ratio Method (MRM) for using ratios of measurements of naturally occurring Beryllium (N-Be) with one or more predictor metals in local background soils to predict the amount of N-Be expected in samples taken in workplaces or other settings to be evaluated. The total Be (T-Be) measured in each individual sample can then be compared with the predicted N-Be to give an estimate of the amount of anthropogenic Be (A-Be) present in that sample, if any. Being based on ratios, this method can accommodate varying dilutions of the soils with other materials, including waste matrices.

4.2 This guide describes the major steps involved in implementing a MRM at a site. These include:

¹ This test method is under the jurisdiction of ASTM Committee **D18** on Soil and Rock and is the direct responsibility of Subcommittee **D18.01** on Surface and Subsurface Characterization.

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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.