



Standard Guide for Sampling Strategies for Heterogeneous Wastes¹

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1. Scope

1.1 This guide is a practical, nonmathematical discussion for heterogeneous waste sampling strategies. This guide is consistent with the particulate material sampling theory, as well as inferential statistics, and may serve as an introduction to the statistical treatment of sampling issues.

1.2 This guide does not provide comprehensive sampling procedures, nor does it serve as a guide to any specification. It is the responsibility of the user to ensure appropriate procedures are used.

1.3 *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. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *attribute, n*—a quality of samples or a population.

2.1.1.1 *Discussion*—Homogeneity, heterogeneity, and practical homogeneity are population attributes. Representativeness and intersample variance are sample attributes.

2.1.2 *characteristic, n*—a property of items, a sample or population that can be measured, counted, or otherwise observed.

2.1.2.1 *Discussion*—A characteristic of interest may be the cadmium concentration or ignitability of a population.

2.1.3 *component, n*—an easily identified item such as a large crystal, an agglomerate, rod, container, block, glove, piece of wood, or concrete.

2.1.4 *composite sample, n*—a combination of two or more samples.

2.1.4.1 *Discussion*—When compositing samples to detect hot spots or whenever there may be a reason to determine which of the component samples that constitute the composite are the source of the detected contaminant, it can be helpful to composite only portions of the component samples. The remainders of the component samples then can be archived for future reference and analysis. This approach is particularly

helpful when sampling is expensive, hazardous, or difficult.

2.1.5 *correlation, n*—the mutual relation of two or more things.

2.1.6 *database, n*—a comprehensive collection of related data organized for quick access.

2.1.6.1 *Discussion*—Database as used in this guide refers to a collection of data generated by the collection and analysis of more than one physical sample.

2.1.7 *data quality objectives (DQO), n*—DQOs are qualitative and quantitative statements derived from the DQO process describing the decision rules and the uncertainties of the decision(s) within the context of the problem(s).

2.1.8 *data quality objective process, n*—a quality management tool based on the scientific method and developed by the U.S. Environmental Protection Agency to facilitate the planning of environmental data collection activities.

2.1.8.1 *Discussion*—The DQO process enables planners to focus their planning efforts by specifying the use of the data (the decision), the decision criteria (action level) and the decision maker's acceptable decision error rates. The products of the DQO process are the DQOs.

2.1.9 *heterogeneity, n*—the condition of the population under which items of the population are not identical with respect to the characteristic of interest.

2.1.10 *homogeneity, n*—the condition of the population under which all items of the population are identical with respect to the characteristic of interest.

2.1.10.1 *Discussion*—Homogeneity is a word that has more than one meaning. In statistics, a population may be considered homogeneous when it has one distribution (for example, if the concentration of lead varies between the different items that constitute a population and the varying concentrations can be described by a single distribution and mean value, then the population would be considered homogeneous). A population containing different strata would not have a single distribution throughout, and in statistics, may be considered to be heterogeneous. The terms *homogeneity* and *heterogeneity* as used in this guide, however, reflect the understanding more common to chemists, geologists, and engineers. The terms are used as described in the previous definitions and refer to the similarity or dissimilarity of items that constitute the population. According to this guide, a population that has dissimilar items would be considered heterogeneous regardless of the type of distribution.

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