



Standard Guide for Generation of Environmental Data Related to Waste Management Activities: Selection and Optimization of Sampling Design¹

This standard is issued under the fixed designation D 6311; 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 document provides practical guidance on the selection and optimization of sample designs in waste management sampling activities, within the context of the requirements established by the data quality objectives or other planning process.

1.2 This document (1) provides guidance for selection of sampling designs; (2) outlines techniques to optimize candidate designs; and (3) describes the variables that need to be balanced in choosing the final optimized design.

1.3 The contents of this guide are arranged by section as follows:

1. Scope
2. Referenced Documents
3. Terminology
4. Significance and Use
5. Summary of Guide
6. Factors Affecting Sampling Design Selection
 - 6.1 Sampling Design Performance Characteristics
 - 6.2 Regulatory Considerations
 - 6.3 Project Objectives
 - 6.4 Knowledge of the Site
 - 6.5 Physical Sample Issues
 - 6.6 Communication with the Laboratory
 - 6.7 Analytical Turn Around Time
 - 6.8 Analytical Method Constraints
 - 6.9 Health and Safety
 - 6.10 Budget/Cost Considerations
 - 6.11 Representativeness
7. Initial Design Selection
8. Optimization Criteria
9. Optimization Process
 - 9.2 Practical Evaluation of Design Alternatives
 - 9.3 Statistical and Cost Evaluation
10. Final Selection

Annex A1. Types of Sampling Designs

- A1.1 Commonly Used Sampling Designs
- A1.2 Sampling Design Tools
- A1.3 Combination Sample Designs

Appendix X1. Additional References

Appendix X2. Choosing Analytical Method Based on Variance and Cost

Appendix X3. Calculating the Number of Samples: A Statistical Treatment

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 and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:

- D 4687 Guide for General Planning of Waste Sampling²
- D 5283 Practice for Generation of Environmental Data Related to Waste Management Activities: Quality Assurance and Quality Control Planning and Implementation²
- D 5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives²
- D 5956 Guide for Sampling Strategies for Heterogeneous Wastes²
- D 6044 Guide for Representative Sampling for Management of Waste and Contaminated Media²
- D 6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities²
- D 6232 Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities²
- D 6233 Guide for Data Assessment for Environmental Waste Management Activities²
- D 6250 Practice for Derivation of Decision Point and Confidence Limit for Statistical Testing of Mean Concentration in Waste Management Decisions²
- D 6323 Guide for Laboratory Subsampling of Media Related to Waste Management Activities²
- E 135 Terminology Relating to Analytical Chemistry for

¹ This guide is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.01 on Planning for Sampling.

Current edition approved Sept. 10, 1998. Published November 1998.

² Annual Book of ASTM Standards, Vol 11.04.