



Standard Guide for Designing Biological Tests with Sediments¹

This standard is issued under the fixed designation E 1525; 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 As the contamination of freshwater and saltwater ecosystems continues to be reduced through the implementation of regulations governing both point and non-point source discharges, there is a growing emphasis and concern regarding historical inputs and their influence on water and sediment quality. Many locations in urban areas exhibit significant sediment contamination, which poses a continual and long-term threat to the functional condition of benthic communities and other species inhabiting these areas (1).² Benthic communities are an important component of many ecosystems and alterations of these communities may affect water-column and nonaquatic species.

1.2 Biological tests with sediments are an efficient means for evaluating sediment contamination because they provide information complementary to chemical characterizations and ecological surveys (2). Acute sediment toxicity tests can be used as screening tools in the early phase of an assessment hierarchy that ultimately could include chemical measurements or bioaccumulation and chronic toxicity tests. Sediment tests have been applied in both saltwater and freshwater environments (2-6). Sediment tests have been used for dredge material permitting, site ranking for remediation, recovery studies following management actions, and trend monitoring. A particularly important application is for establishing contaminant-specific effects and the processes controlling contaminant bioavailability (7).

1.3 This guide is arranged as follows:

	Section
Referenced Documents	2
Terminology	3
Application	4
Summary of Guide	5
Significance and Use	6
Hazards	7
Sediment Test Types	8
Biological Responses	9
Test Organisms	10
Experimental Design Considerations	11

Data Interpretation	12
Keywords	13

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.* For specific hazard statements, see Section 7.

2. Referenced Documents

2.1 ASTM Standards:

- D 1129 Terminology Relating to Water³
- D 4447 Guide for the Disposal of Laboratory Chemicals and Samples⁴
- E 724 Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Mollusc⁴
- E 729 Guide for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians⁴
- E 943 Terminology Relating to Biological Effects and Environmental Fate⁴
- E 1023 Guide for Assessing the Hazard of a Material to Aquatic Organisms and Their Uses⁴
- E 1367 Guide for Conducting 10-Day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods⁴
- E 1383 Guide for Conducting Sediment Toxicity Tests with Freshwater Invertebrates⁴
- E 1391 Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing⁴
- E 1563 Guide for Conducting Static Acute Toxicity Tests with Echinoid Embryos⁴
- E 1611 Guide for Conducting Sediment Toxicity Tests with Polychaetous Annelids⁴
- E 1676 Guide for Conducting a Laboratory Soil Toxicity Test with the Lumbricid Earthworm *Eisenia foetida*⁴
- E 1688 Guide for Determination of the Bioaccumulation of Sediment-associated Contaminants by Benthic Invertebrates⁴

¹ This guide is under the jurisdiction of ASTM Committee E47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.03 on Sediment Assessment and Toxicology.

Current edition approved February 2002. Published March 2002. Originally published as E 1525 – 93. Last previous edition E 1525 – 94a.

² The boldface numbers in parentheses refer to the list of references at the end of this standard.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 11.05.