



Designation: E 1367 – 99

Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods¹

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1. Scope

1.1 This guide (3)^{2,3} describes procedures for obtaining laboratory data concerning the short-term adverse effects of potentially contaminated sediment, or of a test material experimentally added to contaminated or uncontaminated sediment, on marine or estuarine infaunal amphipods during static 10-day exposures. These procedures are useful for testing the effects of various geochemical characteristics of sediments on marine and estuarine amphipods, and could be used to assess sediment toxicity to other infaunal taxa, although modifications of the procedures appropriate to the test species might be necessary. Procedures for 10-day static sediment toxicity tests are described for the following species: *Rhepoxynius abronius*, *Eohaustorius estuarius*, *Ampelisca abdita*, *Grandidierella japonica*, and *Leptocheirus plumulosus*.

1.2 Two documents (USEPA 1994 (1), USEPA-USACE 1999 (2)) provide additional guidance on methods for conducting sediment toxicity tests with estuarine and marine amphipods. This additional guidance includes supplemental information on: 1. sediment collection and storage (Section 10.4), 2. sediment spiking (Section 10.6), 3. collection, handling, and culturing of amphipods (Section 11.4), and 4. statistical analyses (Section 16). USEPA-USACE (1999) also provides guidance on a method for conduction 28-d sediment toxicity tests with the amphipod *Leptocheirus plumulosus*. Endpoints measured in this 28-d test include survival, growth, and reproduction.

1.3 Modifications of these procedures might be appropriate for other sediment toxicity test procedures such as flow-through or partial life-cycle tests. Methods outlined in this guide should also be useful for conducting sediment toxicity tests with other aquatic taxa, although modifications might be necessary. Other test organisms might include other species of amphipods, other crustaceans, polychaetes, and bivalves.

1.4 Other modifications of these procedures might be justified by special needs or circumstances. Although using appropriate procedures is more important than following prescribed procedures, results of tests conducted using unusual procedures are not likely to be comparable to results of many other tests. Comparisons of results obtained using modified and unmodified versions of these procedures might provide useful information concerning new concepts and procedures for conducting sediment tests with infaunal organisms.

1.5 These procedures are applicable to sediments containing most chemicals, either individually or in formulations, commercial products, and known or unknown mixtures. With appropriate modifications these procedures can be used to conduct sediment toxicity tests on factors such as temperature, salinity, dissolved oxygen, and natural sediment characteristics (for example, particle size distribution, organic carbon content, total solids). These methods can also be used to conduct bioconcentration tests and in situ tests, and to assess the toxicity of potentially contaminated field sediments, or of such materials as sewage sludge, oils, particulate matter, and solutions of toxicants added to sediments. A median lethal concentration (LC50) or median sublethal effect concentration (EC50) of toxicants or of highly contaminated sediment mixed into uncontaminated sediment can be determined. Materials either adhering to sediment particles or dissolved in interstitial water can be tested.

1.6 Results of short-term toxicity tests with test materials experimentally added to sediments may be reported in terms of an LC50, and sometimes an EC50 where “concentration” refers to dry or wet weight concentration in sediment. Results of a field survey with single samples to determine a spatial or temporal distribution of sediment toxicity may be reported in terms of percent mortality (see Section 16). Field surveys can be designed to provide either a *qualitative* reconnaissance of the distribution of sediment toxicity or a *quantitative* statistical comparison of toxicity among stations.

1.7 This guide is arranged as follows:

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¹ This guide is under the jurisdiction of ASTM Committee E-47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.03 on Sediment Assessment and Toxicology.

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² Boldface numbers in parentheses refer to the list of references at the end of this guide.

³ This guide is based largely on Guide E 729 and Ref (3).