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Standard Guide for Conducting Life-Cycle Toxicity Tests with Saltwater Mysids[1]

This standard is issued under the fixed designation E1191; 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.

ε[1] NOTE—Section 13.1.11 and References were editorially corrected in January 2023.

1. Scope

1.1 This guide describes procedures for obtaining laboratory data concerning the adverse effects of a test material added to dilution water, but not to food, on certain species of saltwater mysids during continuous exposure from immediately after birth until after the beginning of reproduction using the flow-through technique. These procedures will probably be useful for conducting life-cycle toxicity tests with other species of mysids, although modifications might be necessary.

1.2 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. Comparison of results obtained using modified and unmodified versions of these procedures might provide useful information on new concepts and procedures for conducting life-cycle toxicity tests with saltwater mysids.

1.3 These procedures are applicable to all chemicals, either individually or in formulations, commercial products, or known mixtures, that can be measured accurately at the necessary concentrations in water. With appropriate modifications, these procedures can be used to conduct tests on temperature, dissolved oxygen, and pH and on such materials as aqueous effluents (see also Guide E1192), leachates, oils, particulate matter, sediments, and surface waters.

1.4 This guide is arranged as follows:

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in Section 7.

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.*

[1] This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Actionand is the direct responsibility of Subcommittee E50.47 on Biological Effects and Environmental Fate.

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2. Referenced Documents

2.1 *ASTM Standards:*[2]

E729 Guide for Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians

E943 Terminology Relating to Biological Effects and Environmental Fate (Withdrawn 2023)[3]

E1023 Guide for Assessing the Hazard of a Material to Aquatic Organisms and Their Uses

E1192 Guide for Conducting Acute Toxicity Tests on Aqueous Ambient Samples and Effluents with Fishes, Macroinvertebrates, and Amphibians

E1203 Practice for Using Brine Shrimp Nauplii as Food for Test Animals in Aquatic Toxicology (Withdrawn 2013)[3]

IEEE/ASTM SI 10 American National Standard for Use of the International System of Units (SI): The Modern Metric System

3. Terminology

3.1 The words "must," "should,"" may," "can," and "might" have very specific meanings in this guide.

3.1.1 "Must" is used to express an absolute requirement, that is, to state that the test ought to be designed to satisfy the specified condition, unless the purpose of the test requires a different design. "Must" is only used in connection with factors that directly relate to the acceptability of the test (see 13.1).

3.1.2 "Should" is used to state that the specified condition is recommended and ought to be met if possible. Although violation of one "should" is rarely a serious matter, violation of several will often render the results questionable. Terms such as "is desirable," "is often desirable," and "might be desirable" are used in connection with less important factors.

3.1.3 "May" is used to mean "is (are) allowed to," "can" is used to mean "is (are) able to," and "might" is used to mean "could possibly." Therefore, the classic distinction between may and can is preserved, and might is never used as a synonym for either may or can.

3.2 For definitions of other terms used in this guide, refer to Guide E729, Terminology E943, and Guide E1023. For an explanation of units and symbols, refer to IEEE/ASTM SI 10.

4. Summary of Guide

4.1 In each of two or more treatments, saltwater mysids of one species are maintained in two or more test chambers from immediately after birth until after the beginning of reproduction in a flow-through system. In each of the one or more control treatments, the mysids are maintained in dilution water, to which no test material has been added, in order to provide (*1*) a measure of the acceptability of the test by giving an indication of the quality of the mysids and the suitability of the dilution water, food, test conditions, and handling procedures and (*2*) the basis for interpreting data obtained from the other treatments. In each of the one or more other treatments, the mysids are maintained in dilution water to which a selected concentration of test material has been added. Specified data on the concentration of test material, and the survival, growth, and reproduction of the mysids are obtained and analyzed to determine the effect(s) of the test material on survival, growth, and reproduction of the test organisms.

5. Significance and Use

5.1 Protection of a species requires prevention of unacceptable effects on the number, weight, health, and uses of the individuals of that species. A life-cycle toxicity test is conducted to determine what changes in the numbers and weights of individuals of the test species result from effects of the test material on survival, growth, and reproduction. Information might also be obtained on effects of the material on the health and uses of the species.

5.2 Results of life-cycle tests with mysids might be used to predict long-term effects likely to occur on mysids in field situations as a result of exposure under comparable conditions.

5.3 Results of life-cycle tests with mysids might be used to compare the chronic sensitivities of different species and the chronic toxicities of different materials, and also to study the effects of various environmental factors on results of such tests.

5.4 Results of life-cycle tests with mysids might be an important consideration when assessing the hazards of materials to aquatic organisms (see Guide E1023) or when deriving water quality criteria for aquatic organisms (**1**).[4]

5.5 Results of a life-cycle test with mysids might be useful for predicting the results of chronic tests on the same test material with the same species in another water or with another species in the same or a different water (**2**). Most such predictions take into account results of acute toxicity tests, and so the usefulness of the results from a life-cycle test with mysids is greatly increased by also reporting the results of an acute toxicity test (see Guide E729) conducted under the same conditions.

5.6 Results of life-cycle tests with mysids might be useful for studying the biological availability of, and structure-activity relationships between, test materials.

5.7 Results of life-cycle tests with mysids might be useful for predicting population effects on the same species in another water or with another species in the same or a different water (**3**).

6. Apparatus

6.1 *Facilities*—Flow-through or recirculating brood-stock tanks and flow-through, but not recirculating, test chambers should be maintained in constant-temperature areas or recirculating water baths. An elevated headbox might be desirable so dilution water can be gravity-fed into brood-stock tanks and the metering system (see 6.3), which mixes and delivers test

[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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] The boldface numbers in parentheses refer to the list of references at the end of this guide.