



Standard Guide for Conducting Toxicity Tests with Bioluminescent Dinoflagellates^{1,2}

This standard is issued under the fixed designation E 1924; 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 guide covers two distinct procedures, based on similar principles, for obtaining data concerning the adverse effects of a test material (added to dilution water) on oceanic bioluminescent dinoflagellates.

1.1.1 The endpoint for both procedures is based on a measurable reduction or inhibition in light output from the dinoflagellates. Both procedures are similar in that when bioluminescent dinoflagellates are exposed to toxicants, a measurable reduction in bioluminescence is observed from their cells following mechanical stimulation when compared to control cells. In the first procedure, cells of the bioluminescent dinoflagellate *Gonyaulax polyedra* can be tested over a range of up to seven days of exposure (or longer) to a toxicant. The second procedure uses another species, *Pyrocystis lunula*, for a 4 h test.

1.2 Both procedures can measure the toxic effects of many chemicals, various marine and freshwater effluents, antifouling coatings, leachates, and sediments to bioluminescent dinoflagellates (1-5).³ Compounds with low water solubility such as large organic molecules may be solubilized with methanol, ethanol, and acetone solvents for testing (4) (see Guide E 729).

1.3 An IC₅₀ in light output (bioluminescence) is the recommended endpoint (1). However, percent inhibition of bioluminescence is an appropriate endpoint in some cases (5).

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 other tests. Comparison of results obtained using modified and unmodified versions of these procedures might provide useful information concerning new concepts and procedures for conducting acute and chronic tests.

1.5 The values stated in SI units are to be regarded as the standard.

1.6 *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 1141 Specification for Substitute Ocean Water⁴
- D 5196 Guide for Biomedical Grade Water⁵
- E 178 Practice for Dealing with Outlying Observations⁶
- E 729 Guide for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians⁷
- E 943 Terminology Relating to Biological Effects and Environmental Fate⁷
- E 1023 Guide for Assessing the Hazard of a Material to Aquatic Organisms and their Uses⁷
- E 1192 Guide for Conducting Acute Toxicity Tests on Aqueous Effluents with Fishes, Macro-Invertebrates, and Amphibians⁷
- E 1193 Guide for Conducting Renewal Life-Cycle Toxicity Tests with *Daphnia magna*⁷
- E 1218 Guide for Conducting Static 96-h Toxicity Tests with Microalgae⁷
- E 1391 Guide for Collection, Storage, Characterization, and Manipulation of Sediment for Toxicological Testing⁷
- E 1525 Guide for Designing Biological Tests with Sediments⁷
- E 1733 Guide for Use of Lighting in Laboratory Testing⁷

3. Terminology

3.1 **Definitions:** The words “must,” “should,” “may,” “can,” and “might” have very specific meanings in this guide.

3.1.1 **can**—is used to mean is (are) able to.

3.1.2 **may**—is used to mean is (are) allowed to.

3.1.3 **might**—is used to mean could possibly.

3.1.4 **must**—is used to express an absolute requirement, that

¹ This guide is under the jurisdiction of ASTM Committee E47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.01 on Aquatic Assessment and Toxicology.

Current edition approved Dec 10, 1997. Published June 1998.

² This standard Guide is a document developed using the consensus mechanisms of ASTM, that provides guidance for the selection of procedures to accomplish a specific test but which does not stipulate specific procedures.

³ The boldface numbers given in parentheses refer to a list of references at the end of the text.

⁴ *Annual Book of ASTM Standards*, Vol 11.02.

⁵ *Annual Book of ASTM Standards*, Vol 11.01.

⁶ *Annual Book of ASTM Standards*, Vol 14.02.

⁷ *Annual Book of ASTM Standards*, Vol 11.05.