



Standard Guide for Conducting a Terrestrial Soil-Core Microcosm Test¹

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1. Scope

1.1 This guide defines the requirements and procedures for using soil-core microcosms to test the environmental fate, ecological effects, and environmental transport of chemicals that may enter terrestrial ecosystems. The approach and the materials suggested for use in the microcosm test are also described.

1.2 This guide details a procedure designed to supply site-specific or possibly regional information on the probable chemical fate and ecological effects in a soil system resulting from the release or spillage of chemicals into the environment in either liquid or solid form.

1.3 Experience has shown that microcosms are most helpful in the assessment process after preliminary knowledge about the chemical properties and biological activity have been obtained. Data generated from the test can then be used to compare the potential terrestrial environmental hazards of a chemical.

1.4 *This standard does not purport to address all of the safety problems, 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:²

[D422 Test Method for Particle-Size Analysis of Soils](#)

[D511 Test Methods for Calcium and Magnesium In Water](#)

[D515 Test Method for Phosphorus In Water](#) (Withdrawn 1997)³

[D1426 Test Methods for Ammonia Nitrogen In Water](#)

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

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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.

[D2167 Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method](#)

[D2216 Test Methods for Laboratory Determination of Water \(Moisture\) Content of Soil and Rock by Mass](#)

[D2488 Practice for Description and Identification of Soils \(Visual-Manual Procedure\)](#)

[D3867 Test Methods for Nitrite-Nitrate in Water](#)

2.2 U.S. Environmental Protection Agency:

[Environmental Effects Test Guidelines, EPA 560/6-82-002, 1982⁴](#)

[Chemical Fate Test Guideline, EPA 560/6-82-003, 1982⁵](#)

3. Terminology

3.1 Definitions:

3.1.1 *soil-core terrestrial microcosm*—an intact soil-core containing the natural assemblages of biota surrounded by the boundary material. The system includes all equipment, facilities, and instrumentation necessary to maintain, monitor, and control the environment.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *terrestrial microcosm or micro-ecosystem*—a physical model of an interacting community of autotrophs, omnivores, herbivores, carnivores and decomposers within an intact soil profile. The forcing functions, for example, light intensity and duration, water quality and watering regime, temperature, and toxicant dose for the test system, are under the investigator's control. This test system is distinguished from test tube and single-species toxicity tests by the presence of a natural assemblage of organisms. This assemblage creates a higher order of ecological complexity and, thus, provides the capacity to evaluate chemical effects on component interactions and ecological processes. Certain features of this test system, however, set limits on the types of questions that can be addressed. Those limitations are related to scale and sampling, which in turn constrain both (a) the type of ecosystems and

⁴ Available from the Office of Pesticides and Toxic Substances, Washington, DC. Also available as PB82–23992 from National Technical Information Service (NTIS), United States Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161.

⁵ Available from Office of Pesticides and Toxic Substances, Washington, DC. Also available as PB82–233008 from National Technical Information Service (NTIS), United States Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161.