



# Standard Guide for Measuring the Presence of Planar Organic Compounds Which Induce CYP1A, Using Reporter Gene Test Systems<sup>1</sup>

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## 1. Scope

1.1 This guide covers the recommended guidelines for performing a test for presence of organic compounds that bind to the Ah Receptor and induce the CYP1A locus on the vertebrate chromosome. Under appropriate test conditions, induction of CYP1A is evidence that the cells have been exposed to one or more of these xenobiotic organic compounds that include dioxins, furans, coplanar PCBs, and several polycyclic aromatic hydrocarbons (PAHs). Detection of induction has been made simple and rapid by the stable integration of the firefly plasmid such that Ah-receptor binding results in the production of luciferase. Luciferase production is a function of both the potency of the compound(s) and the concentration. This type of Human Reporter Gene System (HRGS) has shown concentration-response relationships using 2,3,7,8-TCDD, 5 coplanar PCBs, and several polycyclic aromatic hydrocarbons (PAHs) (1-3).<sup>2</sup> This guide describes test conditions under which solvent extracts of environmental samples (water, tissue, soil, or sediments) may be tested for the presence of CYP1A-inducing organic compounds.

1.2 The test procedures presented in this guide have been published previously (4, 5) and established as EPA Method 4425 (6). These references should be consulted to obtain details regarding the construction and maintenance of the cell line, and the response of the cells to various organic substances.

1.3 All laboratory health and safety procedures should be followed. This includes the use of glasses, gloves, and other protective clothing, when handling the reagents. Information on toxicity, handling procedures and waste procedures should be reviewed prior to use of all chemicals.

1.4 *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.*

1.5 This guide is arranged as follows:

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## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>3</sup>

D 3976 Practice for Preparation of Sediment Samples for Chemical Analysis

E 1023 Guide for Assessing the Hazard of a Material to Aquatic Organisms and Their Uses

E 1391 Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Toxicological Testing and for Selection of Samplers Used to Collect Benthic Invertebrates

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

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.