



Standard Test Method for Using Field-Portable Fiber Optics Synchronous Fluorescence Spectrometer for Quantification of Field Samples for Aromatic and Polycyclic Aromatic Hydrocarbons¹

This standard is issued under the fixed designation E2143; 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 test method covers a rapid method for the screening of environmental samples for aromatic hydrocarbons (AHs) and polycyclic aromatic hydrocarbons (PAHs). The screening takes place in the field and provides immediate feedback on limits of contamination by substances containing AHs and PAHs. Quantification is obtained by the use of appropriately characterized, site-specific calibration curves. Remote sensing by use of optical fibers is useful for accessing difficult to reach areas or potentially dangerous materials or situations. When contamination of field personnel by dangerous materials is a possibility, use of remote sensors may minimize or eliminate the likelihood of such contamination taking place.

1.2 This test method is applicable to AHs and PAHs present in samples extracted from soils or in water. This test method is applicable for field screening or, with an appropriate calibration, quantification of total AHs and PAHs.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

[D1129 Terminology Relating to Water](#)

[D4489 Practices for Sampling of Waterborne Oils](#)

[D5412 Test Method for Quantification of Complex Polycyclic Aromatic Hydrocarbon Mixtures or Petroleum Oils in Water](#)

[E131 Terminology Relating to Molecular Spectroscopy](#)

[E388 Test Method for Wavelength Accuracy and Spectral Bandwidth of Fluorescence Spectrometers](#)

[E578 Test Method for Linearity of Fluorescence Measuring Systems](#)

[E579 Test Method for Limit of Detection of Fluorescence of Quinine Sulfate in Solution](#)

3. Terminology

3.1 For definitions of terms used in this test method refer to Terminology [D1129](#) and [E131](#).

4. Summary of Test Method

4.1 This test method consists of extracting the AHs and PAHs from soil samples or preparation of water samples followed by synchronous fluorescence analysis with a field-portable instrument. The samples require serial dilutions of samples to establish a linear response. These measurements are made using standard fluorescence cuvettes. While some optimization of selectivity can be accomplished by varying the wavelength difference between excitation and emission monochromators, generally spectra generated from petroleum contaminants with a wavelength difference such as 6 or 18 nm provide good results and no preliminary spectra are required (see Test Method [D5412](#)).

4.2 Different soils have varying partition coefficients. Therefore, representative samples of a subset of the extracts or the water samples should be analyzed by gas chromatography (GC) or other appropriate methods. The purpose is to establish a site-specific calibration curve to be used for quantification of total AHs and PAHs in the environmental samples of interest.

4.3 When desirable, determination of AHs and PAHs may be made remotely using an optical fiber.

¹ This test method is under the jurisdiction of ASTM Committee E13 on Molecular Spectroscopy and Separation Science and is the direct responsibility of Subcommittee E13.09 on Fiber Optics, Waveguides, and Optical Sensors.

Current edition approved Jan. 1, 2013. Published January 2013. Originally approved in 2001. Last previous edition approved in 2006 as E2143 – 01 (2006)^{ε1}. DOI: 10.1520/E2143-01R13.

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.