



Standard Practice for General Techniques of Liquid Chromatography-Infrared (LC/ IR) and Size Exclusion Chromatography-Infrared (SEC/IR) Analyses¹

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1. Scope

1.1 This practice covers techniques that are of general use in qualitatively analyzing multicomponent samples by using a combination of liquid chromatography (LC) or size exclusion chromatography (SEC) with infrared (IR) spectrometric techniques. The sample mixture is separated into fractions by the chromatographic separation. These fractions are subsequently analyzed by an IR spectroscopic method.

1.2 Three different types of LC/IR techniques have been used to analyze samples (1, 2).² These consist of eluent trapping (see Practices E334), flowcell and direct deposition. These are presented in the order that they were first used.

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:³

E131 Terminology Relating to Molecular Spectroscopy

E168 Practices for General Techniques of Infrared Quantitative Analysis

E334 Practice for General Techniques of Infrared Microanalysis

E1421 Practice for Describing and Measuring Performance of Fourier Transform Mid-Infrared (FT-MIR) Spectrometers: Level Zero and Level One Tests

3. Terminology

3.1 *Definitions*—For definitions of terms and symbols, refer to Terminology E131.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *hit quality index (HQI), n*—the comparison of infrared spectroscopic data against a database of reference spectra of known compounds is often employed to assist in the determination of the evolved gas chemical identity. Search algorithms generate a listing of reference compounds from the database that are spectroscopically similar to the evolved gas spectrum. These reference compounds are ranked with regard to a measurement of the comparative fit of the reference spectral data to that of the spectrum of the evolved gas. This ranking is referred to as the hit quality index (HQI).

4. Significance and Use

4.1 This practice provides general guidelines for the practice of liquid chromatography or size exclusion chromatography coupled with infrared spectrometric detection and analysis (LC/IR, SEC/IR). This practice assumes that the chromatography involved is adequate to resolve a sample into discrete fractions. It is not the intention of this practice to instruct the user on how to perform liquid or size exclusion chromatography (LC or SEC).

5. General LC/IR Techniques

5.1 Three different LC/IR techniques have been used to analyze samples. These consist of eluent trapping, flowcell and direct deposition. These are presented in the order that they were first developed. Infrared detection for any of these techniques can be provided by IR monochromators, IR filter spectrometers and Fourier transform infrared spectrometers (FT-IR). These detectors yield either single absorption band or total infrared spectrum detection modes. Detection mode is dependent upon the type of IR detector employed and the acquisition time required by the LC or SEC experiment.

¹ This practice is under the jurisdiction of ASTM Committee E13 on Molecular Spectroscopy and Separation Science and is the direct responsibility of Subcommittee E13.03 on Infrared and Near Infrared Spectroscopy.

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

³ 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.