



Standard Practice for General Techniques of Gas Chromatography Infrared (GC/ IR) Analysis¹

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1. Scope

1.1 This practice covers techniques that are of general use in analyzing qualitatively multicomponent samples by using a combination of gas chromatography (GC) and infrared (IR) spectrophotometric techniques. The mixture is separated into its individual components by GC and then these individual components are analyzed by IR spectroscopy. Types of GC-IR techniques discussed include eluent trapping, flowcell, and elute deposition.

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

1.3 *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

E131 Terminology Relating to Molecular Spectroscopy

E168 Practices for General Techniques of Infrared Quantitative Analysis (Withdrawn 2015)³

E260 Practice for Packed Column Gas Chromatography

E334 Practice for General Techniques of Infrared Microanalysis

E355 Practice for Gas Chromatography Terms and Relationships

E932 Practice for Describing and Measuring Performance of Dispersive Infrared Spectrometers

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 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.

E1252 Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis

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

E1510 Practice for Installing Fused Silica Open Tubular Capillary Columns in Gas Chromatographs

3. Terminology

3.1 *Definitions*—For definitions of terms and symbols, refer to Terminology E131 and Practice E355.

4. Significance and Use

4.1 This practice provides general guidelines for the proper practice of gas chromatography coupled with infrared spectrophotometric detection and analysis (GC/IR). This practice assumes that the chromatography involved in the practice is adequate to separate the compounds of interest. It is not the intention of this practice to instruct the user how to perform gas chromatography properly.

5. General GC/IR Techniques

5.1 Three different types of GC/IR technique have been used to analyze samples. These consist of analyte trapping, flowcell, or lightpipe, and direct elute deposition and are presented in the order that they were first used.

5.2 The GC eluent must not be routed to a destructive GC detector (such as a flame ionization detector) prior to reaching the IR detector as this will destroy or alter the individual components. It is acceptable to split the eluent so that part of the stream is directed to such a detector or to pass the stream back to the detector after infrared analysis if such techniques are feasible.

5.3 *Eluent Trapping Techniques*—Analyte trapping techniques are the least elaborate means for obtaining GC/IR data. In these techniques, the sample eluting from the chromatograph is collected in discrete aliquots to be analyzed. In utilizing such techniques, it is essential that a GC detector be employed to allow definition of component elution. If a destructive detector is employed, then post-column splitting to that detector is required. GC fractions can be trapped in the condensed phase by passing the GC effluent through a solvent,