



Standard Practices for General Techniques of Infrared Quantitative Analysis¹

This standard is issued under the fixed designation E 168; 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 These practices cover the techniques most often used in infrared quantitative analysis. Practices associated with the collection and analysis of data on a computer are included as well as practices that do not use a computer.

1.2 *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.* Specific hazard statements appear in Section 6 and Note A4.7, Note A4.11, and Note A5.6.

2. Referenced Documents

2.1 ASTM Standards:²

- E 131 Terminology Relating to Molecular Spectroscopy
- E 334 Practice for General Techniques of Infrared Microanalysis
- E 932 Practice for Describing and Measuring Performance of Dispersive Infrared Spectrometers
- E 1252 Practice for General Techniques for Qualitative Infrared Analysis
- E 1421 Practice for Describing and Measuring Performance of Fourier Transform Infrared (FT-IR) Spectrometers: Level Zero and Level One Tests
- E 1655 Practices for Infrared Multivariate Quantitative Analysis

3. Terminology

3.1 For definitions of terms and symbols, refer to Terminology E 131.

¹ These practices are under the jurisdiction of ASTM Committee E13 on Molecular Spectroscopy and are the direct responsibility of Subcommittee E13.03 on 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.

4. Significance and Use

4.1 These practices are intended for all infrared spectroscopists. For novices, these practices will serve as an overview of preparation, operation, and calculation techniques. For experienced persons, these practices will serve as a review when seldom-used techniques are needed.

5. Apparatus

5.1 The infrared techniques described here assume that the equipment is of at least the usual commercial quality and meets the standard specifications of the manufacturer. For dispersive instruments, also refer to Practice E 932. For Fourier Transform and dispersive instruments, also refer to Practices E 1421 and E 932 respectively, and for microanalysis with these instruments see Practice E 334.

5.2 In developing a spectroscopic method, it is the responsibility of the originator to describe the instrumentation and the performance required to duplicate the repeatability and bias of a method. It is necessary to specify this performance in terms that can be used by others in applications of the method.

6. Hazards

6.1 Users of these practices must be aware that there are inherent dangers associated with the use of electrical instrumentation, infrared cells, solvents, and other chemicals, and that these practices cannot and will not substitute for a practical knowledge of the instrument, cells, and chemicals used in a particular analysis.

7. Considerations for Quantitative Infrared Measurements

7.1 Quantitative infrared analysis is commonly done with grating, filter, prism, or interferometer instruments. The following guidelines for setting up an analytical procedure are appropriate:

7.1.1 Always operate the instrument in the most stable and reproducible conditions attainable. This includes instrument warm-up time, sample temperature equilibration, and exact reproduction of instrument performance tests for both standards and samples. After calibration, use equivalent settings for

