



Standard Practice for Testing Flame Ionization Detectors Used in Gas or Supercritical Fluid Chromatography¹

This standard is issued under the fixed designation E594; 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 practice covers the testing of the performance of a flame ionization detector (FID) used as the detection component of a gas or supercritical fluid (SF) chromatographic system.

1.2 This recommended practice is directly applicable to an FID that employs a hydrogen-air or hydrogen-oxygen flame burner and a dc biased electrode system.

1.3 This recommended practice covers the performance of the detector itself, independently of the chromatographic column, the column-to-detector interface (if any), and other system components, in terms that the analyst can use to predict overall system performance when the detector is made part of a complete chromatographic system.

1.4 For general gas chromatographic procedures, Practice E260 should be followed except where specific changes are recommended herein for the use of an FID. For definitions of gas chromatography and its various terms see recommended Practice E355.

1.5 For general information concerning the principles, construction, and operation of an FID, see Refs (1, 2, 3, 4).²

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

1.7 *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.* For specific safety information, see Section 5.

¹ This practice is under the jurisdiction of ASTM Committee E13 on Molecular Spectroscopy and Separation Science and is the direct responsibility of Subcommittee E13.19 on Separation Science.

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² The boldface numbers in parentheses refer to the list of references appended to this recommended practice.

2. Referenced Documents

2.1 ASTM Standards:³

E260 Practice for Packed Column Gas Chromatography

E355 Practice for Gas Chromatography Terms and Relationships

2.2 CGA Standards:

CGA P-1 Safe Handling of Compressed Gases in Containers⁴

CGA G-5.4 Standard for Hydrogen Piping Systems at Consumer Locations⁴

CGA P-9 The Inert Gases: Argon, Nitrogen and Helium⁴

CGA V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures⁴

CGA P-12 Safe Handling of Cryogenic Liquids⁴

HB-3 Handbook of Compressed Gases⁴

3. Terminology

3.1 Definitions:

3.1.1 *drift*—the average slope of the baseline envelope expressed in amperes per hour as measured over ½ h.

3.1.2 *noise (short-term)*—the amplitude expressed in amperes of the baseline envelope that includes all random variations of the detector signal of a frequency on the order of 1 or more cycles per minute (see Fig. 1).

3.1.2.1 *Discussion*—Short-term noise corresponds to the observed noise only. The actual noise of the system may be larger or smaller than the observed value, depending upon the method of data collection or signal monitoring from the detector, since observed noise is a function of the frequency, speed of response, and the bandwidth of the electronic circuit measuring the detector signal.

3.1.3 *other noise*—Fluctuations of the baseline envelope of a frequency less than 1 cycle per minute can occur in chromatographic systems.

3.1.4 *Discussion*—The amplitude of these fluctuations may actually exceed the short-term noise. Such fluctuations are

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.

⁴ Available from Compressed Gas Association (CGA), 4221 Walney Rd., 5th Floor, Chantilly, VA 20151-2923, <http://www.cganet.com>.