



Designation: E 1510 – 95

Standard Practice for Installing Fused Silica Open Tubular Capillary Columns in Gas Chromatographs¹

This standard is issued under the fixed designation E 1510; 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 is intended to serve as a general guide for the installation and maintenance of fused silica capillary columns in gas chromatographs which are already retrofitted for their use. This practice excludes information on:

- 1.1.1 Injection techniques.
- 1.1.2 Column selection.
- 1.1.3 Data acquisition.
- 1.1.4 System troubleshooting and maintenance.

1.2 For additional information on gas chromatography, please refer to Practice E 260. For specific precautions, see Notes 1-4.

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.* For specific safety information see Section 6 and Notes 2-4.²

2. Referenced Documents

2.1 ASTM Standards:

- E 260 Practice for Packed Column Gas Chromatography³
- E 355 Practice for Gas Chromatography Terms and Relationships³
- E 516 Practice for Testing Thermal Conductivity Detectors Used in Gas Chromatography³
- E 594 Practice for Testing Flame Ionization Detectors Used in Gas Chromatography³
- E 697 Practice for Use of Electron-Capture Detectors Used in Gas Chromatography³

2.2 CGA Publications:

- CGA P-1 Safe Handling of Compressed Gases in Containers⁴
- CGA G-5.4 Standard for Hydrogen Piping Systems at Consumer Locations⁴

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

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² Reprinted by permission of Restek Corp., 110 Benner Circle, Bellefonte, PA 16823-8812.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Available from Compressed Gas Association, Inc., 1725 Jefferson Davis Highway, Arlington, VA 22202-4100.

TABLE 1 Typical Splitter Vent Flow Rates (50 to 1 split ratio) (at optimum linear velocity)

Carrier gas	0.25-mm ID, cm ³ /min	0.32-mm ID, cm ³ /min	0.53-mm ID, cm ³ /min
helium	35	80	125
hydrogen	70	160	250

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

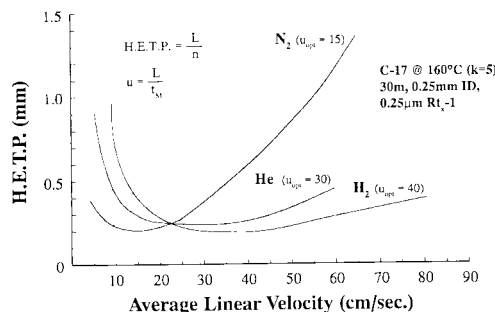
3.1 Terms and relations are defined in Practice E 355.

3.2 Nomenclature for open tubular or capillary columns with a bore of 0.75 mm or less:

3.3 *porous layer open tubular (PLOT)*—refers to columns with particles attached on the inside wall consisting of copolymers such as styrene/divinylbenzene, molecular sieves, or adsorbents such as Al₂O₃ in film thicknesses of 5 to 50 μm.

3.4 *support coated open tubular (SCOT)*—refers to fine particles (silica or fine diatomite) coated with liquid stationary phase which is then deposited on the inside column wall to improve stationary phase stability and sample capacity.

3.5 *wall coated open tubular (WCOT)*—refers to columns coated on the inside wall with a liquid stationary phase in film



NOTE 1—The curves were generated by plotting the height equivalent to a theoretical plate (length of column divided by the total number of theoretical plates, H.E.T.P.) against the column's average linear velocity. The lowest point on the curve indicates the carrier gas velocity in which the highest column efficiency is reached.

FIG. 1 Van Deemter Profile for Hydrogen, Helium, and Nitrogen Carrier Gases⁴