



Standard Test Method for Determination of Hydrocarbons and Non-Hydrocarbon Gases in Gaseous Mixtures by Gas Chromatography¹

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1. Scope

1.1 This test method is intended to quantitatively determine the non-condensed hydrocarbon gases with carbon numbers from C_1 to C_5+ and non-hydrocarbon gases, such as H_2 , CO_2 , O_2 , N_2 , and CO , in gaseous samples. This test method is a companion standard test method to Test Method [D1945](#) and Practice [D1946](#) differing in that it incorporates use of capillary columns instead of packed columns and allows other technological differences.

1.2 Hydrogen sulfide can be detected but may not be accurately determined by this procedure due to loss in sample containers or sample lines and possible reactions unless special precautions are taken.

1.3 Non-hydrocarbon gases have a lower detection limit in the concentration range of 0.03 to 100 mole percent using a thermal conductivity detector (TCD) and C_1 to C_6 hydrocarbons have a lower detection limit in the range of 0.005 to 100 mole percent using a flame ionization detector (FID); using a TCD may increase the lower detection limit to approximately 0.03 mole percent.

1.3.1 Hydrocarbon detection limits can be reduced with the use of pre-concentration techniques and/or cryogenic trapping.

1.4 This test method does not fully determine individual hydrocarbons heavier than benzene, which are grouped together as C_7+ . When detailed analysis is not required the compounds with carbon number greater than C_5 may be grouped as either C_6+ , or C_7+ . Accurate analysis of C_5+ components depends on proper vaporization of these compounds during sampling at process unit sources as well as in the sample introduction into the analyzer in the laboratory.

1.5 Water vapor may interfere with the C_6+ analysis if a TCD detector is used.

1.6 Helium and argon may interfere with the determination of hydrogen and oxygen respectively. Depending on the

analyzer used, pentenes, if present, may either be separated or grouped with the C_6+ components.

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

1.8 *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

[D1945 Test Method for Analysis of Natural Gas by Gas Chromatography](#)

[D1946 Practice for Analysis of Reformed Gas by Gas Chromatography](#)

[D3588 Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels](#)

[E355 Practice for Gas Chromatography Terms and Relationships](#)

[E1510 Practice for Installing Fused Silica Open Tubular Capillary Columns in Gas Chromatographs](#)

[F307 Practice for Sampling Pressurized Gas for Gas Analysis](#)

2.2 ASTM Publication:

[ASTM DS 4B, 1991 Physical Constants of Hydrocarbon and Non-Hydrocarbon Compounds](#)

3. Terminology

3.1 Terminology related to the practice of gas chromatography can be found in Practice [E355](#).

3.2 Definitions:

3.2.1 *sample set*—a collection of samples taken from the same source or at similar component composition and concentrations.

¹ This test method is under the jurisdiction of ASTM Committee [D03](#) on Gaseous Fuels and is the direct responsibility of Subcommittee [D03.07](#) on Analysis of Chemical Composition of Gaseous Fuels.

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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.