



Standard Test Method for Determination of C₂ through C₅ Hydrocarbons in Gasolines by Gas Chromatography¹

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1. Scope

1.1 This test method provides for the determination of the two (C₂) through five (C₅-) carbon paraffins and mono-olefins in gasolines. The concentrations by volume or mass (weight) of the following components are generally reported:

- 1.1.1 Ethylene plus ethane
- 1.1.2 Propane
- 1.1.3 Propylene
- 1.1.4 Isobutane
- 1.1.5 *n*-Butane
- 1.1.6 Butene-1 plus isobutylene
- 1.1.7 *trans*-Butene-2
- 1.1.8 *cis*-Butene-2
- 1.1.9 Isopentane
- 3-Methylbutene-1
- 1.1.10 *n*-Pentane
- 1.1.11 Pentene-1
- 1.1.12 2-Methylbutene-1
- 1.1.13 *trans*-Pentene-2
- 1.1.14 *cis*-Pentene-2
- 1.1.15 2-Methylbutene-2

1.2 This test method does not provide for the determination of cyclic olefins, diolefins, or acetylenes. These are usually minor components in finished gasolines.

1.3 Samples to be analyzed should not contain significant amounts of material boiling lower than ethylene.

1.4 SI (metric) units of measurement are preferred and used throughout this standard. Alternative units, in common usage, are also provided to improve the clarity and aid the user of this test method.

1.5 *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:*

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04 on Hydrocarbon Analysis.

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D 1319 Test Method for Hydrocarbon Types In Liquid Petroleum Products by Fluorescent Indicator Adsorption²

D 2001 Test Method for Depentanization of Gasoline and Naphthas²

3. Summary of Test Method

3.1 The sample is injected into a gas - liquid partition column. The components are separated as they pass through the column with an inert carrier gas and their presence in the effluent is detected and recorded as a chromatogram. Materials containing components having more than five carbon atoms can either be backflushed from the system without measurement, or recorded as a broad peak by reversing the direction of the carrier gas through the column at such time as to regroup the higher-boiling portion (C₆ and heavier) of the sample. If backflushing is used, the concentration of C₂ through C₅ hydrocarbons may be related to the whole sample by adding a known quantity of low-boiling internal standard to the sample prior to analysis. Alternatively, a known amount of sample can be charged and compared to a standard sample run under the same conditions. Sample composition is determined from the chromatogram by comparing peak areas with those obtained using known amounts of calibration standards or a synthetic blend.

4. Significance and Use

4.1 In hydrocarbon type analyses of gasolines, such as Test Method D 1319, highly volatile fuels can need to be stabilized by depentanization (Test Method D 2001) prior to analysis. A knowledge of the composition of light hydrocarbons in the overhead from depentanization is useful in converting analyses of the depentanized fraction to total sample.

5. Apparatus

5.1 *Chromatograph*—Any chromatograph having a thermostated oven and a detection system of adequate sensitivity may be used. The detection system must have sufficient sensitivity to produce a recorder deflection of at least 5 mm for 0.1 liquid volume percent of pentene-1 in the sample or synthetic blend being analyzed.

NOTE 1—If the sensitivity of a given system is inadequate, it can be increased by using a more sensitive recorder or detector, or by using more

² *Annual Book of ASTM Standards*, Vol 05.01.