Designation: D3710 – 95 (Reapproved 2009)

Standard Test Method for Boiling Range Distribution of Gasoline and Gasoline Fractions by Gas Chromatography[1]

This standard is issued under the fixed designation D3710; 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 test method covers the determination of the boiling range distribution of gasoline and gasoline components. This test method is applicable to petroleum products and fractions with a final boiling point of 500°F (260°C) or lower as measured by this test method.

1.2 This test method is designed to measure the entire boiling range of gasoline and gasoline components with either high or low Reid vapor pressure and is commonly referred to as gas chromatography (GC) distillation (GCD).

1.3 This test method has not been validated for gasolines containing oxygenated compounds (for example, alcohols or ethers).

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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.* For specific hazard statements, see Note 9 and 7.2.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure

D323 Test Method for Vapor Pressure of Petroleum Products (Reid Method)

D1265 Practice for Sampling Liquefied Petroleum (LP) Gases, Manual Method

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

3. Terminology

3.1 *Definitions:*

3.1.1 *final boiling point* (FBP)—the point at which a cumulative volume count equal to 99.5 % of the total volume count under the chromatogram is obtained.

3.1.2 *initial boiling point* (IBP)—the point at which a cumulative volume count equal to 0.5 % of the total volume count under the chromatogram is obtained.

3.1.3 *relative molar response*—the measured area of a compound divided by the moles present in the synthetic mixture relative to an arbitrarily chosen component.

3.1.4 *response factor*—a constant of proportionality that converts area to liquid volume.

3.1.5 *system noise*—the difference between the maximum and minimum area readings per second for the first 20 area readings in the blank run.

3.1.6 *volume count*—the product of the area under a peak and a response factor.

4. Summary of Test Method

4.1 The sample is introduced into a gas chromatographic column which separates hydrocarbons in boiling point order. Conditions are selected so as to measure isopentane and lighter saturates discretely. Normal pentane and heavier compounds are not completely resolved but are measured as pseudo components of narrow boiling range. The column temperature is raised at a reproducible rate and the area under the chromatogram is recorded throughout the run. Boiling temperatures are assigned to the time axis from a calibration curve, obtained under the same conditions by running a known mixture of hydrocarbons covering the boiling range expected in the sample. From these data the boiling range distribution of the sample is obtained.

5. Significance and Use

5.1 The determination of the boiling range distribution of gasoline by GC distillation provides an insight into the composition of the components from which the gasoline has been blended. This insight also provides essential data necessary to calculate the vapor pressure of gasoline, which has been traditionally determined by Test Method D323. In addition, the Test Method D86 distillation curve can be predicted using GCD data. See Annex A1.

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04.0H on Chromatographic Distribution Methods.

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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.

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