



Designation: D8071 – 21

Standard Test Method for Determination of Hydrocarbon Group Types and Select Hydrocarbon and Oxygenate Compounds in Automotive Spark-Ignition Engine Fuel Using Gas Chromatography with Vacuum Ultraviolet Absorption Spectroscopy Detection (GC-VUV)¹

This standard is issued under the fixed designation D8071; 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 is a standard procedure for the determination in percent mass or percent volume of hydrocarbon group types (paraffins, isoparaffins, olefins, naphthenes, aromatics), methanol, ethanol, benzene, toluene, ethylbenzene, xylenes, naphthalene, and methylnaphthalenes in automotive spark-ignition engine fuels using gas chromatography and vacuum ultraviolet detection (GC-VUV).

1.1.1 The concentration ranges for which precision has been determined are as follows:

Property	Units	Applicable Range
Paraffins	% Volume	3.572 to 23.105
Isoparaffins	% Volume	22.697 to 71.993
Olefins	% Volume	0.011 to 44.002
Olefins	% Mass	0.027 to 41.954
Naphthenes	% Volume	0.606 to 18.416
Aromatics	% Volume	14.743 to 58.124
Methanol	% Volume	0.063 to 3.426
Ethanol	% Mass	0.042 to 15.991
Benzene	% Volume	0.09 to 1.091
Toluene	% Volume	0.698 to 31.377
Ethylbenzene	% Volume	0.5 to 3.175
Xylenes	% Volume	3.037 to 18.955
Naphthalene	% Volume	0.019 to 0.779
Methylnaphthalenes	% Volume	0.21 to 1.484

1.1.2 This test method may be applicable to other concentration ranges, to other properties, or to other hydrocarbon streams, however precision has not been determined.

1.2 Individual hydrocarbon components are typically not baseline-separated by the procedure described in this test method, that is, some components will coelute. The coelutions are resolved at the detector using VUV absorbance spectra and deconvolution algorithms.

1.3 While this test method reports percent mass and percent volume for several specific components that may be present in

automotive spark-ignition engine fuel, it does not attempt to speciate all possible components that may occur in automotive spark-ignition engine fuel. In particular, this test method is not intended as a type of detailed hydrocarbon analysis (DHA).

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. See specific hazard statements in subsection 8.4 and Section 9.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- [D1319 Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption](#)
- [D3606 Test Method for Determination of Benzene and Toluene in Spark Ignition Fuels by Gas Chromatography](#)
- [D4057 Practice for Manual Sampling of Petroleum and Petroleum Products](#)
- [D4307 Practice for Preparation of Liquid Blends for Use as Analytical Standards](#)
- [D5599 Test Method for Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection](#)

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.04.01 on Gas Chromatography Methods.

Current edition approved July 1, 2021. Published August 2021. Originally approved in 2017. Last previous edition approved in 2020 as D8071 – 20. DOI: 10.1520/D8071-21.

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.

*A Summary of Changes section appears at the end of this standard