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.

Designation: D7423 – 16a

Standard Test Method for Determination of Oxygenates in C2, C3, C4, and C5 Hydrocarbon Matrices by Gas Chromatography and Flame Ionization Detection[1]

This standard is issued under the fixed designation D7423; 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 gas chromatographic procedure for the quantitative determination of organic oxygenates in C2, C3, C4, and C5 matrices by multidimensional gas chromatography and flame ionization detection. This test method is applicable when the hydrocarbon matrices have a final boiling point not greater than 200 °C. Oxygenate compounds include, but are not limited to, those listed in Table 1. The linear working range for oxygenates is 0.50 mg/kg to 100 mg/kg.

1.2 This test method is intended to determine the mass concentration of each oxygenate in the hydrocarbon matrix. Oxygenate compound identification is determined by reference standards and column elution retention order.

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

1.4 *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]

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

D1835 Specification for Liquefied Petroleum (LP) Gases

D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants

D6849 Practice for Storage and Use of Liquefied Petroleum Gases (LPG) in Sample Cylinders for LPG Test Methods

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E355 Practice for Gas Chromatography Terms and Relationships

3. Terminology

3.1 Additional terminology related to the practice of gas chromatography can be found in Practice E355.

3.2 *Definitions:*

3.2.1 *liquefied petroleum gas (LPG), n*—a mixture of normally gaseous hydrocarbons, predominantly propane or butane, or both, that has been liquefied by compression or cooling, or both, to facilitate storage, transport, and handling. **D4175**

3.2.2 *oxygenate, n*—an oxygen-containing ashless organic compound, such as an alcohol or ether, which may be used as a fuel or fuel supplement. **D4175**

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *Dean's switching method*—representative aliquot of sample is injected on-column using a sample valve (or via a gas chromatograph split inlet). The sample passes onto a nonpolar column, which elutes the lighter hydrocarbons in boiling point order to the analytical column and backflushes the heavier hydrocarbons to vent. The oxygenate compounds elute from the analytical column and are detected via a flame ionization detector.

3.3.2 *Dean's switching method direct inject*—gas chromatographic valve configuration equipped with a valve connected

[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.D0.04 on C4 and C5 Hydrocarbons.

Current edition approved Dec. 1, 2016. Published January 2017. Originally approved in 2009. Last pervious edition approved in 2016 as D7423 – 16ε1. DOI: 10.1520/D7423-16A.

[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**

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