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: D2268 – 93 (Reapproved 2017)

Standard Test Method for Analysis of High-Purity *n*-Heptane and *iso*octane by Capillary Gas Chromatography[1]

This standard is issued under the fixed designation D2268; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers and provides for the analysis of high-purity (greater than 99.5 % by volume) *n*-heptane and *iso*octane (2,2,4-trimethylpentane), which are used as primary reference standards in determining the octane number of a fuel. Individual compounds present in concentrations of less than 0.01 % can be detected. Columns specified by this test method may not allow separation of all impurities in reference fuels.

1.2 The values stated in SI units are to be regarded as the standard.

1.2.1 *Exception*—The values given in parentheses are for information only.

1.3 *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.*

1.4 *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. Summary of Test Method

2.1 The sample is injected into a capillary gas chromatographic column consisting of at least 61 m (200 ft) of stainless steel tubing (0.25 mm (0.010 in.) inside diameter), the inner walls of which are coated with a thin film of stationary liquid. An inert gas transports the sample through the column, in which it is partitioned into its individual components. As each component is eluted from the column, it is detected with a hydrogen flame ionization detector and recorded on a conventional strip-chart recording potentiometer. The detector response from each impurity is then compared with that of a known quantity of an internal standard. After determining the total impurity concentration, the *n*-heptane, or *iso*octane purity is obtained by difference.

3. Significance and Use

3.1 This test method is used for specification analysis of high-purity *n*-heptane and *iso*octane, which are used as ASTM Knock Test Reference Fuels. Hydrocarbon impurities or contaminants, which can adversely affect the octane number of these fuels, are precisely determined by this method.

4. Apparatus

4.1 *Chromatograph*—Gas chromatograph should be equipped with a split-stream inlet device for introducing minute quantities of sample without fractionation, a capillary column, and a hydrogen flame ionization detector. An electrometer to amplify the low output signal of the hydrogen flame ionization detector, and a strip-chart recorder for recording the detector signal are needed. The time constant of neither the electrometer nor the recorder should exceed 1 s. A ball and disk integrator or electronic integrator for peak area measurements should be used. The detection system must have sufficient sensitivity to produce a recorder deflection for cyclohexane of at least 8 divisions on a standard 0–100 scale chart using 0.10 % by volume of cyclohexane in *n*-heptane as defined in 7.1.

4.2 *Microsyringe*—A microsyringe is needed for injecting the sample into the split-stream inlet device.

4.3 *Volumetric Pipet,* 0.1 mL capacity.

4.4 *Analytical Balance,* 200 g capacity.

5. Reagents and Materials

5.1 *Carrier Gas*—Argon, Nitrogen, or Helium; 99.99 % or greater purity. (**Warning**—Compressed gases under high pressure.)

5.2 *Fuel Gas*—Hydrogen; 99.99 % or greater purity. (**Warning**—Compressed gas under high pressure. Extremely flammable gas.)

[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 D02.04.0L on Gas Chromatography Methods.

Current edition approved Oct. 1, 2017. Published November 2017. Originally approved in 1964. Last previous edition approved in 2013 as D2268 – 93 (2013). DOI: 10.1520/D2268-93R17.

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