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Standard Test Method for Motor Octane Number of Spark-Ignition Engine Fuel[1]

This standard is issued under the fixed designation D 2700; 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 laboratory test method covers the quantitative determination of the knock rating of liquid spark-ignition engine fuel in terms of Motor octane number except that this test method may not be applicable to fuel and fuel components that are primarily oxygenates.[2] The sample fuel is tested in a standardized single cylinder, four-stroke cycle, variable compression ratio, carbureted, CFR engine run in accordance with a defined set of operating conditions. The octane number scale is defined by the volumetric composition of primary reference fuel blends. The sample fuel knock intensity is compared to that of one or more primary reference fuel blends. The octane number of the primary reference fuel blend that matches the knock intensity of the sample fuel establishes the Motor octane number.

1.2 The octane number scale covers the range from 0 to 120 octane number, but this test method has a working range from 40 to 120 octane number. Typical commercial fuels produced for automotive spark-ignition engines rate in the 80 to 90 Motor octane number range. Typical commercial fuels produced for aviation spark-ignition engines rate in the 98 to 102 Motor octane number range. Testing of gasoline blend stocks or other process stream materials can produce ratings at various levels throughout the Motor octane number range.

1.3 The values of operating conditions are stated in SI units and are considered standard. The values in parentheses are the historical inch-pounds units. The standardized CFR engine measurements continue to be in inch-pound units only because of the extensive and expensive tooling that has been created for this equipment.

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.* For more specific hazard statements, see Section 8, 13.4.1, 14.5.1, 15.6.1, Annex A1, A2.3.9, A2.4.8, A3.2.7.2(*7*), A4.2.3.1, A4.2.3.3(*6*) and (*9*), A4.3.5, X2.3.7, X3.2.3.1, X3.3.4.1, X3.3.9.3, X3.3.12.4, and X3.5.1.8.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water[3]

D 1744 Test Method for Water in Liquid Petroleum Products by Karl Fischer Reagent[4]

D 2268 Test Method for Analysis of High-Purity *n*-Heptane and *Iso*octane by Capillary Gas Chromatography[5]

D 2360 Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by Gas Chromatography[6]

D 2699 Test Method for Research Octane Number of Spark Ignition Engine Fuel[7]

D 2885 Test Method for Determination of Octane Number of Spark-Ignition Engine Fuels by On-Line Direct Comparison Technique[7]

D 3703 Test Method for Peroxide Number of Aviation Turbine Fuels[8]

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products[8]

D 4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants[8]

D 4177 Practice for Automatic Sampling of Petroleum and Petroleum Products[8]

D 4814 Specification for Automotive Spark-Ignition Engine Fuel[8]

D 5842 Practice for Sampling and Handling of Fuels for Volatility Measurements[9]

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.01 on Combustion Characteristics.

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[2] Research octane number, determined using Test Method D 2699, is a companion method to provide a similar but typically higher octane rating under milder operating conditions.

[3] *Annual Book of ASTM Standards*, Vol 11.01.

[4] Discontinued. See 1999 *Annual Book of ASTM Standards*, Vol 05.01.

[5] *Annual Book of ASTM Standards*, Vol 05.01.

[6] *Annual Book of ASTM Standards*, Vol 06.04.

[7] *Annual Book of ASTM Standards*, Vol 05.05.

[8] *Annual Book of ASTM Standards*, Vol 05.02.

[9] *Annual Book of ASTM Standards*, Vol 05.03.

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

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