



Standard Test Method for Evaluating Automotive Spark-Ignition Engine Fuel for Electronic Port Fuel Injector Fouling by Bench Procedure¹

This standard is issued under the fixed designation D 6421; 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 a bench test procedure to evaluate the tendency of automotive spark-ignition engine fuel to foul electronic port fuel injectors (PFI). The test method utilizes a bench apparatus equipped with Bosch injectors specified for use in a 1985-1987 Chrysler 2.2-L turbocharged engine. This test method is based on a test procedure developed by the Coordinating Research Council (CRC) for prediction of the tendency of spark-ignition engine fuel to form deposits in the small metering clearances of injectors in a port fuel injection engine (see CRC Report No. 592²).

1.2 The test method is applicable to spark-ignition engine fuels, which may contain antioxidants, corrosion inhibitors, metal deactivators, dyes, deposit control additives, demulsifiers, or oxygenates, or a combination thereof.

1.3 The values stated in SI units are to be regarded as the standard. Approximate inch-pound units are shown in parentheses for information purposes only.

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.* Specific precautionary statements are given throughout this test method.

NOTE 1—If there is any doubt as to the latest edition of Test Method D 6421, contact ASTM Headquarters. Other properties of significance to spark-ignition engine fuel are described in Specification D 4814.

2. Referenced Documents

2.1 ASTM Standards:

D 4814 Specification for Automotive Spark-Ignition Engine Fuel³

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.A on Gasoline and Oxygenated Fuels.

Current edition approved Dec. 10, 1999. Published January 2000. Originally published as D 6421-99. Last previous edition D 6421-99.

² "A Program to Evaluate a Bench Scale Test Method to Determine the Deposit Forming Tendencies of Port Fuel Injectors," available from Coordinating Research Council, Inc., 219 Perimeter Ctr. Pkwy., Atlanta, GA 30346.

³ *Annual Book of ASTM Standards*, Vol 05.02.

D 5598 Test Method for Evaluating Unleaded Automotive Spark-Ignition Engine Fuel for Electronic Port Fuel Injector Fouling⁴

2.2 ANSI Standard:⁵

MC 96.1 American National Standard for Temperature Measurement Thermocouples.

2.3 CARB Standard:⁶

Test Method for Evaluating Port Fuel Injector (PFI) Deposits in Vehicle Engines

2.4 Clean Air Act Amendment:⁷

Clean Air Act Amendments of 1990, Public Law 101-549, Title 1 – Provisions for Attainment and Maintenance of National Air Quality Standards

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *base fuel, n*—unleaded automotive spark-ignition engine fuel that does not contain a deposit control additive but may contain antioxidants, corrosion inhibitors, metal deactivators, dyes, or oxygenates, or a combination thereof.

3.1.2 *cycle, n*—a 15 s pulsing period, followed by a 50 min heating period at 160°C (320°F), followed by a 10 min cool down period.

3.1.3 *deposit control additive, n*—material added to the base fuel to prevent or remove deposits in the entire engine intake system.

3.1.3.1 *Discussion*—For the purposes of this test method, the performance of a deposit control additive is limited to the electronic PFI tip areas.

3.1.4 *driveability, n*—the quality of a vehicle's performance characteristics as perceived by the operator in response to changes in throttle position.

⁴ *Annual Book of ASTM Standards*, Vol 05.03.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁶ Available from California Air Resources Board, P.O. Box 2815, Sacramento, CA 95815. (Incorporated by reference in California Code of Regulations, Title 13, Section 2257.)

⁷ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

