



Standard Test Method for Evaluating Diesel Fuel Lubricity by an Injection Pump Rig¹

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INTRODUCTION

All diesel fuel injection equipment relies, to some extent, on diesel fuel as a lubricant. Shortened life of diesel fuel injection pumps and injectors from wear caused by excessive friction has sometimes been ascribed to lack of lubricity in the fuel. This test assesses the lubricity of a fuel by operation of the fuel in a typical fuel injection system comprised of injection pump, high pressure pipes, and injectors on a pump test rig bench. The test models an actual commercial application of such equipment. The pump performance is evaluated on a test bench meeting SAE J1668 requirements.

1. Scope

1.1 This test method covers evaluating the lubricity of diesel fuels using a pump rig test and Stanadyne Model DB4427-4782 pumps.

NOTE 1—Other pumps may be used if a correlation between pump performance factors and fuel lubricity has been developed.

1.2 This test method is applicable to any fuel used in diesel engines, including those which may contain a lubricity enhancing additive.

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.* Specific warning statements are given in Section 7.

2. Referenced Documents

2.1 ASTM Standards:²

D329 Specification for Acetone

D362 Specification for Industrial Grade Toluene (Withdrawn 1989)³

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products

D4306 Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination

D6078 Test Method for Evaluating Lubricity of Diesel Fuels by the Scuffing Load Ball-on-Cylinder Lubricity Evaluator (SLBOCLE)

D6079 Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)

2.2 SAE Standards:⁴

SAE J967 Calibration Fluid for Diesel Injection Equipment

SAE J968/1 Diesel Injection Pump Testing—Part 1: Calibrating Nozzles and Holder Assemblies

SAE J1418 Fuel Injection Pumps—High Pressure Pipes (Tubing) for Testing

SAE J1668 Diesel Engines—Fuel Injection Pump Testing

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *boundary lubrication, n*—a condition in which the friction and wear between two surfaces in relative motion are determined by the properties of the surfaces and the properties of the contacting fluid, other than bulk viscosity.

3.1.1.1 *Discussion*—Metal to metal contact occurs and the chemistry of the system is involved. Physically adsorbed or

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.E0 on Burner, Diesel, Non-Aviation Gas Turbine, and Marine Fuels.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.