Designation: D 6891 – 03

An American National Standard

Standard Test Method for Evaluation of Automotive Engine Oils in the Sequence IVA Spark-Ignition Engine[1]

This standard is issued under the fixed designation D 6891; 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 measures the ability of crankcase oil to control camshaft lobe wear for spark-ignition engines equipped with an overhead valve-train and sliding cam followers. This test method is designed to simulate extended engine idling vehicle operation. The Sequence IVA Test Method uses a Nissan KA24E engine. The primary result is camshaft lobe wear (measured at seven locations around each of the twelve lobes). Secondary results include cam lobe nose wear and measurement of iron wear metal concentration in the used engine oil. Other determinations such as fuel dilution of crankcase oil, non-ferrous wear metal concentrations, and total oil consumption, can be useful in the assessment of the validity of the test results.[2]

1.2 The values stated in either SI units or in other units shall be regarded separately as standard.

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 and health practices and determine the applicability of regulatory limitations prior to use.* See Annex A5 for specific safety precautions.

2. Referenced Documents

2.1 *ASTM Standards:* [3]

D 287 Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)

D 323 Test Method for Vapor Pressure of Petroleum Products (Reid Method)

D 381 Test Method for Gum Content in Fuels by Jet Evaporation

D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)

D 525 Test Method for Oxidation Stability of Gasoline (Induction Period Method)

D 3525 Test Method for Gasoline Diluent in Used Gasoline Engine Oils by Gas Chromatography

D 4485 Specification for Performance of Engine Oils

D 5185 Test Method for Determination of Additive Elements, Wear Metals, and Contaminants in Used Lubricating Oils and Determination of Selected Elements in Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

D 5302 Test Method for Evaluation of Automotive Engine Oils for Inhibition of Deposit Formation and Wear in a Spark-Ignition Internal Combustion Engine Fueled with Gasoline and Operated Under Low-Temperature, Light Duty Conditions

D 5844 Test Method for Evaluation of Automotive Engine Oils for Inhibition of Rusting (Sequence IID)

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 230 Specification and Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples

G 40 Terminology Relating to Wear and Erosion

2.2 *API Standard:*

API 1509 Engine Oil Licensing and Certification System[4]

2.3 *SAE Standards:*

SAE J183 Engine Oil Performance and Engine Service Classification[5]

SAE J254 Instrumentation and Techniques for Exhaust Gas Emissions Measurement[5]

2.4 *ASME Standard:*

B46.1 Standard for Surface Texture (Surface Roughness, Waviness, and Lay)[6]

2.5 *JASO Standard:*

M 328-95 Valve-train Wear Test Procedure for Evaluating

[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.B0 on Automotive Lubricants.

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[2] The ASTM Test Monitoring Center will update changes in this test method by means of Information Letters. Information letters may be obtained from the ASTM Test Monitoring Center (TMC), 6555 Penn Ave., Pittsburgh, PA 15206-4489, Attention: Administrator.

[3] 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.

[4] Available from The American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005.

[5] Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001.

[6] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990.

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