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Standard Specification for Lubricants for Two-Stroke-Cycle Spark-Ignition Gasoline Engines (TSC-4)¹

This standard is issued under the fixed designation D 4681; 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 specification sets out the requirements of lubricants intended for use in two-stroke-cycle spark-ignition gasoline engines, typically larger water-cooled outboard motors, which are particularly prone to damage caused by deposit-induced preignition and to problems involving ring sticking, piston scuffing, and corrosion. A method is described by which the conformance of a lubricant to these requirements can be determined.

1.2 *The following safety hazards caveat pertains only to the test methods described in this specification. These test methods may involve the use of hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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.*

1.3 The values for temperature, pressure, etc. stated in SI units are the standard; except that as the test engine used is designed to inch-pound standards, the values for dimensions, clearances, etc. stated in inch-pound units are the standard for the purpose of test engine setup and inspection. The conversion value of 25.4 mm = 1 in. is exact.

2. Referenced Documents

2.1 ASTM Standards:

- B 152 Specification for Copper, Sheet, Strip, Plate, and Rolled Bar²
- D 97 Test Methods for Pour Point of Petroleum Oils³
- D 235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)³
- D 439 Specification for Automotive Gasoline³
- D 664 Test Method for Acid Number by Potentiometric Titration³
- D 874 Test Method for Sulfated Ash from Lubricating Oils and Additives³
- D 1193 Specification for Reagent Water⁴
- D 2270 Practice for Calculating Viscosity Index from Kinematic Viscosity at 40°C and 100°C⁵
- D 2896 Test Method for Total Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration⁵

D 2983 Test Method for Low-Temperature Viscosity of Automotive Fluid Lubricants Measured by Brookfield Viscometer⁵

D 4682 Specification for Miscibility with Gasoline and the Fluidity of Two-Stroke-Cycle Gasoline Engine Lubricants⁶

E 230 Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples⁷

G 1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens⁸

2.2 ANSI Standard:

MC 96.1 American National Standard for Temperature Measurement Thermocouples⁹

3. Descriptions of Terms Specific to This Standard

3.1 *cowls, cowlings*—the components that enclose the powerhead, whether removable manually or not.

3.2 *engine*—sometimes used as a synonym for motor; both terms can be found in the literature.

3.3 *load wheel, test tank propeller*—a power-absorbing device used instead of a propeller when the outboard motor is operated in a test tank.

3.4 *lower unit*—the portions of the outboard motor other than the powerhead and its cowlings.

3.5 *motor*—the total assembly of cowls, powerhead, and lower unit, excluding the propeller or load wheel and steering, remote control, and electrical cables external to the cowls. This term must not be used as a synonym for powerhead.

3.6 *plug fouling*—deposition of essentially non-conducting material onto the electrodes of a spark plug that can, but will not necessarily, prevent the plug from operating.

3.7 *plug whiskering or plug bridging*—a deposit of conductive material on the spark plug electrodes, that tends to form a bridge between them, thus shorting out the plug.

3.8 *powerhead*—the two-stroke-cycle gasoline engine that provides power to the outboard motor, including carburetors, fuel pumps, flywheel, flywheel alternator, starter, ignition system, and all other directly connected components required for its operation but excluding components attached to the short block by tubes or wires only.

3.9 *scuff, scuffing*—in lubrication, damage caused by instantaneous local welding between the piston and bore surfaces that does not result in immobilization of the parts.

¹ This specification is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.B on Automotive Lubricants.

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² Annual Book of ASTM Standards, Vol 02.01.

³ Annual Book of ASTM Standards, Vol 05.01.

⁴ Annual Book of ASTM Standards, Vol 05.05 or 11.01.

⁵ Annual Book of ASTM Standards, Vol 05.02.

⁶ Annual Book of ASTM Standards, Vol 05.03.

⁷ Annual Book of ASTM Standards, Vol 14.01.

⁸ Annual Book of ASTM Standards, Vol 03.02.

⁹ Order from the American Society of Mechanical Engineers, 345 East 42nd St., New York, NY 10017.