



Standard Test Method for Demulsibility Characteristics of Lubricating Oils¹

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1. Scope

1.1 This test method covers the measurement of the ability of oil and water to separate from each other. It is intended for use in testing medium and high-viscosity lubricating oils.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 ASTM Standards:

D 96 Test Method for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure)²

D 1193 Specification for Reagent Water³

D 1796 Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)²

3. Summary of Test Method

3.1 *For Oils That Do Not Contain Extreme Pressure (EP) Additives*—A 405-mL sample of the oil and 45 mL of distilled water are stirred together for 5 min at 82°C (180°F) in a special graduated separatory funnel. After a 5-h settling period following the stirring, a percentage of the water in the oil and the volumes of water and emulsion separating from the oil are measured and recorded.

3.2 *For Oils That Contain Extreme Pressure (EP) Additives*—A 360-mL sample of the oil and 90 mL of distilled water are stirred together for 5 min at 82 °C (180 °F) in a special graduated separatory funnel. After a 5-h settling period following the stirring, percentage of water in the oil and the volumes of water and emulsion separating from the oil are measured and recorded.

4. Significance and Use

4.1 This test provides a guide for determining the demulsi-

bility characteristic of lubricating oils that are prone to water contamination and may encounter the turbulence of pumping and circulation capable of producing water-in-oil emulsions.

5. Apparatus

5.1 *Stirrer*,⁴ constructed from parts shown in Fig. 1 and Fig. 2.

5.2 *Special Graduated Separatory Funnel*,⁴ as shown in Fig. 3.

5.3 *Heating Bath*, sufficiently large and deep to permit the immersion of at least two test separatory funnels in the bath liquid up to their 500-mL graduation mark. The bath shall be capable of maintaining a temperature of $82 \pm 1^\circ\text{C}$ ($180 \pm 2^\circ\text{F}$) and shall be so equipped to hold the separatory funnels securely in a position so that the vertical axis of the stirrer corresponds to the center line of the separatory funnel during the mixing of the oil and water.

5.4 *Centrifuge*, as described in Method A of Test Method D 96 and Test Method D 1796.

5.5 *Centrifuge Tubes*, long-form, 195 to 203 mm (8 in.) as described in Fig. 1 of Test Methods D 96 and D 1796.

6. Materials

6.1 *Cleaning Solvent*—Any suitable solvent capable of cleaning and effectively removing any oil or fluid from the stirrer and graduated cylinder. 1,1,1-Trichloroethane has been found suitable for use in this test method.

NOTE 1—**Warning:** 1,1,1-Trichloroethane, Harmful if inhaled or swallowed. Eye irritant. High concentration can cause unconsciousness or death.

NOTE 2—In cases in which the use of 1,1,1 trichloroethane is unacceptable, some laboratories are using heptane or mineral spirits as alternative solvents. The effect on the precision of this test method when using an alternate solvent has not been determined.

6.2 *Water*—Type II reagent grade water conforming to Specification D 1193.

7. Preparation of Apparatus

7.1 Clean the graduated cylinder by removing any film of oil (or fluid) with cleaning solvent followed by a wash first with acetone (see Note 3) and then with tap water, immerse the cylinder in a suitable cleaning solution. Rinse thoroughly with tap water and then with nonreferee reagent water.

⁴ Available from Research Appliance Co., Moose Lodge Rd., Dept. T, Cambridge, MD 21613.

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.L on Industrial Lubricants.

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² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 11.01.