



Standard Test Method for Determination of Homogeneity and Miscibility in Automotive Engine Oils¹

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1. Scope

1.1 This test method covers the determination if an automotive engine oil is homogeneous and will remain so, and if it is miscible with certain standard reference oils after being submitted to a prescribed cycle of temperature changes. This test method is very similar to the homogeneity and miscibility test described in FED–STD–791/3470.1.

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 97 Test Method for Pour Point of Petroleum Products²
- D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³
- D 5844 Test Method for Evaluation of Automotive Engine Oils for Inhibition of Rusting (Sequence IID)⁴
- D 6557 Test Method for Evaluation of Rust Preventive Characteristics of Automotive Engine Oils⁵
- E 1 Specification for ASTM Thermometers⁶
- E 344 Terminology Relating to Thermometry and Hydrometry⁶
- 2.2 *Federal Test Method Standard:*
 - FED–STD–791/3470.1 Homogeneity and Miscibility of Oils⁷

3. Terminology

3.1 Definitions:

3.1.1 *calibrate*, *v*—to determine the indication or output of a measuring device with the respect of that of a standard.

E 344

3.1.2 *homogeneity*, *n*—the ability of a test oil itself to remain the same in appearance throughout (uniform) after submission to a series of temperature changes.

3.1.3 *miscibility*, *n*—the ability of a reference oil and test oil to form a uniform mixture after blending and not separate into two phases after submission to a series of temperature changes.

3.1.4 *reference oil*, *n*—an oil of known performance characteristics, used as a basis for comparison.

3.1.4.1 *Discussion*—Reference oils are used to calibrate testing facilities, to compare the performance of other oils, or to evaluate other materials (such as seals) that interact with oils.

D 5844

3.1.5 *specimen*, *n*—a piece or portion of test oil used to make a test.

3.1.6 *test oil*, *n*—any oil subjected to evaluation in an established procedure.

D 6557

4. Summary of Test Method

4.1 Visual color determinations and observations are made on an undiluted test oil specimen, along with six blends of the same test oil that have been combined with specific reference oils. The pour point is then determined for the undiluted test oil specimen and the six blends. The undiluted test oil specimen and six blends are then allowed to warm to room temperature. Color determinations and observations are again made on the undiluted test oil specimen and six blends. The undiluted test oil specimen and six blends are heated to 232°C, then allowed to cool to room temperature, and then stored at their pour point temperatures for 18 to 24 h. The undiluted test oil specimen and six blends are then allowed to thaw and a series of color determinations and observations are made as they reach room temperature. All data are recorded on a report form.

5. Significance and Use

5.1 It is important that engine oils from different manufacturers be homogeneous and miscible with each other, because operators of automotive engines often do not have prior

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² *Annual Book of ASTM Standards*, Vol 05.01.

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

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

⁵ *Annual Book of ASTM Standards*, Vol 05.04.

⁶ *Annual Book of ASTM Standards*, Vol 14.03.

⁷ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098.