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Standard Test Method for Storage Stability of Water-in-Oil Emulsions by the Oven Test Method[1]

This standard is issued under the fixed designation D3707; 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 covers the stability of water-in-oil emulsions when held at a constant elevated temperature.

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:*[2]

D1744 Test Method for Determination of Water in Liquid Petroleum Products by Karl Fischer Reagent

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Summary of Test Method

3.1 A 100-mL sample contained in a graduated 100-mL cylinder is placed in a thermostatically controlled oven at 85°C (185°F) for 48 or 96 h. The sample is then examined for the amount of free oil and free water separated. In addition, water contents of the sample at specified levels in the upper and lower layers of the sample are also obtained.

4. Significance and Use

4.1 This test method indicates the stability of the emulsion during storage and normal usage.

5. Apparatus

5.1 *Convection Oven,* meeting the requirements of Specification E145.

5.2 *Graduated Cylinder*—A stoppered 100-mL glass cylinder graduated in 1-mL increments.[3] The stopper should have a vent groove to prevent pressure buildup during the test.

5.3 *Pipet,* 10-mL glass.

5.4 *Microsyringe,* 0.05-mL glass with a fixed needle, No. 19 gage, point style No. 3.

5.5 *Glass Vials,* approximately 30-mL size.

6. Preparation of Sample

6.1 To ensure uniformity of the sample, it should be mixed thoroughly before removing the quantity required for the test. Vigorous hand shaking or mechanical mixing for 3 to 5 min is recommended for litre-size containers or less.

6.2 Special difficulties arise in mixing and withdrawing representative samples from large containers. This is due to the nature of water-in-oil emulsions which are two-phase systems as distinct from truly homogeneous systems. Vigorous mechanical stirring for an extended period is the best means of achieving homogeneity. However, for unstable emulsions that have been in storage for some time, there is no satisfactory way to obtain a representative sample.

7. Test Method A—48-h Test

7.1 After careful preparation of the sample to obtain homogeneity (described in Section 6), transfer 100 mL to a graduated 100-mL cylinder. Insert the vented stopper.

7.2 Place the cylinder in a convection oven maintained at 85 ± 1°C (185 ± 2°F) for a period of 48 h. Take care to position the graduated cylinder in the oven generally in the center and raise at least 75 mm from the bottom of the oven, to ensure temperature uniformity.

NOTE 1—When carrying out a number of tests at the same time, arrange the cylinders to avoid developing temperature variations in the oven due to inadequate convection. The number of tests carried out at the same time should, for the same reason, also be restricted.

[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.N0.02 on Industrial Applications.

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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] A "crows-foot" cylinder, British Standard BS 658, may be used.