



Designation: D 6417 – 02

An American National Standard

Standard Test Method for Estimation of Engine Oil Volatility by Capillary Gas Chromatography¹

This standard is issued under the fixed designation D 6417; 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 an estimation of the amount of engine oil volatilized at 371°C (700°F).

1.1.1 This test method can also be used to estimate the amount of oil volatilized at any temperature between 126 and 371°C, if so desired.

1.2 This test method is limited to samples having an initial boiling point (IBP) greater than 126°C (259°F) or the first calibration point and to samples containing lubricant base oils with end points less than 615°C (1139°F) or the last n-paraffins in the calibration mixture. By using some instruments and columns, it is possible to extend the useful range of the test method.

1.3 This test method uses the principles of simulated distillation methodology.

1.4 This test method may be applied to both lubricant oil base stocks and finished lubricants containing additive packages. These additive packages generally contain high molecular weight, non-volatile components that do not elute from the chromatographic column under the test conditions. The calculation procedure used in this test method assumes that all of the sample elutes from the column and is detected with uniform response. This assumption is not true for samples with non-volatile additives, and the results might be biased high relative to Test Method D 5480, which uses an internal standard to account for the uneluted material. For this reason, results by this test method are reported as area percent of oil.

1.5 The values stated in SI units are to be regarded as standard. The values stated in inch-pound units are provided for information only.

1.6 *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:

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04.0H on Chromatographic Distribution Methods.

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D 2887 Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography²

D 4626 Practice for Calculation of Gas Chromatographic Response Factors³

D 5480 Test Method for Motor Oil Volatility by Gas Chromatography⁴

D 5800 Test Method for Evaporation Loss of Lubricating Oils by the Noack Method⁴

E 355 Practice for Gas Chromatographic Terms and Relationships⁵

E 594 Practice for Testing Flame Ionization Detectors Used in Gas Chromatography⁵

E 1510 Practice for Installing Fused Silica Open Tubular Capillary Columns in Gas Chromatographs⁵

2.2 DIN Standard:

DIN 51.581 Noack Evaporative Test⁶

3. Terminology

3.1 **Definitions**—This test method makes reference to many common gas chromatographic procedures, terms, and relationships. Detailed definitions of these can be found in Practices E 355, E 594, and E 1510.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 **area slice**—the area resulting from the integration of the chromatographic detector signal within a specified retention time interval. In area slice mode (see 6.5.2), peak detection parameters are bypassed and the detector signal integral is recorded as area slices of consecutive, fixed duration time intervals.

3.2.2 **corrected area slice**—an area slice corrected for baseline offset by subtraction of the exactly corresponding area slice in a previously recorded blank (nonsample) analysis.

3.2.3 **cumulative corrected area**—the accumulated sum of corrected area slices from the beginning of the analysis through a given retention time (RT), ignoring any nonsample area (for example, solvent).

3.2.4 **slice rate**—the time interval used to integrate the

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 14.02.

⁶ Published by Deutsches Institut für Normung and available from Beuth Verlag, GmbH, Burggrafenstrasse 6, 1000 Berlin 30, Germany.