



Designation: D6375 – 24

Standard Test Method for Evaporation Loss of Lubricating Oils by Thermogravimetric Analyzer (TGA) Noack Method¹

This standard is issued under the fixed designation D6375; 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 procedure for determining the Noack evaporation loss of lubricating oils using a thermogravimetric analyzer test (TGA). The test method is applicable to base stocks and fully formulated lubricant oils having a Noack evaporative loss ranging from 0 % to 30 % by mass. This procedure requires much smaller specimens, and is faster when multiple samples are sequentially analyzed, and safer than the standard Noack method using Wood's metal.

1.2 The evaporative loss determined by this test method is the same as that determined using the standard Noack test methods.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.06 on Analysis of Liquid Fuels and Lubricants.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D5800 Test Method for Evaporation Loss of Lubricating Oils by the Noack Method

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

D6792 Practice for Quality Management Systems in Petroleum Products, Liquid Fuels, and Lubricants Testing Laboratories

E1582 Test Method for Temperature Calibration of Thermogravimetric Analyzers

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology **D4175**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *Noack reference oil, n*—the oil provided by Noack equipment manufacturers to check proper operation of the Noack evaporation tester.

3.2.2 *Noack reference time, n*—the time (in minutes) required for the Noack reference oil to reach its known Noack evaporative loss under the conditions used in this test method.

3.2.3 *TGA Noack volatility, n*—the evaporative loss (in mass percent) of a lubricant as determined in this test method.

4. Summary of Test Method

4.1 A lubricant specimen is placed in an appropriate TGA specimen pan. The pan is placed on the TGA pan holder and quickly heated to between 247 °C and 249 °C under a stream of air, and then held isothermal for an appropriate time. Throughout this process, the TGA monitors and records the mass loss experienced by the specimen due to evaporation. The Noack evaporation loss is subsequently determined from the specimen weight percent loss versus time curve (TG curve) as the mass percent lost by the specimen at the Noack reference time determined under the same TGA conditions.

5. Significance and Use

5.1 This test method is a safe and fast alternative for determination of the Noack evaporation loss of a lubricant.

*A Summary of Changes section appears at the end of this standard