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An American National Standard
British Standard 4450



Designation: 4/96

Standard Test Method for Ash from Petroleum Products¹

This standard is issued under the fixed designation D 482; 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.

This test method was adopted as a joint ASTM-IP standard in 1965.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of ash in the range 0.001–0.180 mass %, from distillate and residual fuels, gas turbine fuels, crude oils, lubricating oils, waxes, and other petroleum products, in which any ash-forming materials present are normally considered to be undesirable impurities or contaminants (Note 1). The test method is limited to petroleum products which are free from added ash-forming additives, including certain phosphorus compounds (Note 2).

NOTE 1—In certain types of samples, all of the ash-forming metals are not retained quantitatively in the ash. This is particularly true of distillate oils, which require a special ash procedure in order to retain metals quantitatively.

NOTE 2—This test method is not intended for the analysis of unused lubricating oils containing additives; for such samples use Test Method D 874. Neither is it intended for the analysis of lubricating oils containing lead nor for used engine crankcase oils.

1.2 SI units are regarded as the standard. The preferred expression of the property is mass %.

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 874 Test Method for Sulfated Ash from Lubricating Oils and Additives²

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³

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 D02.03 on Elemental Analysis.

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In the IP, this method is under the jurisdiction of the Standardization Committee.

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

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

D 4177 Practice for Automatic Sampling of Petroleum and Petroleum Products³

D 4928 Test Method for Water in Crude Oils by Coulometric Karl Fischer Titration⁴

D 6299 Practice for Applying Statistical Quality Assurance Techniques to Evaluate Analytical Measurement System Performance⁵

3. Summary of Test Method

3.1 The sample contained in a suitable vessel is ignited and allowed to burn until only ash and carbon remain. The carbonaceous residue is reduced to an ash by heating in a muffle furnace at 775°C, cooled and weighed.

4. Significance and Use

4.1 Knowledge of the amount of ash-forming material present in a product can provide information as to whether or not the product is suitable for use in a given application. Ash can result from oil or water-soluble metallic compounds or from extraneous solids such as dirt and rust.

5. Apparatus

5.1 *Evaporating Dish or Crucible*, made of platinum, silica, or porcelain, of 90 mL minimum capacity to 120-mL maximum capacity.

5.2 *Electric Muffle Furnace*, capable of maintaining a temperature of 775 ± 25°C and preferably having suitable apertures at the front and rear so as to allow a slow natural draught of air to pass through.

5.3 *Meeker Gas Burner*, or equivalent.

5.4 *Mechanical Shaker*.⁶

6. Reagents

6.1 *Propan-2-ol*—(**Warning**—Flammable, can be explosive when evaporated to or near dryness.)

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

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

⁶ A satisfactory mechanical shaker is available from the Eberbach Corp., 505 S. Maple Rd., Ann Arbor, MI 48106-1024.