



Standard Practice for Proximate Analysis of Coal and Coke¹

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1. Scope

1.1 This practice covers the determination of moisture, volatile matter, and ash and the calculation of fixed carbon on coals and cokes sampled and prepared by prescribed methods and analyzed according to ASTM established procedures.

1.2 *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

D121 Terminology of Coal and Coke

D346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis

D388 Classification of Coals by Rank

D2013/D2013M Practice for Preparing Coal Samples for Analysis

D2234/D2234M Practice for Collection of a Gross Sample of Coal

D3173 Test Method for Moisture in the Analysis Sample of Coal and Coke

D3174 Test Method for Ash in the Analysis Sample of Coal and Coke from Coal

D3175 Test Method for Volatile Matter in the Analysis Sample of Coal and Coke

D4596 Practice for Collection of Channel Samples of Coal in a Mine

D5192 Practice for Collection of Coal Samples from Core

D6883 Practice for Manual Sampling of Stationary Coal from Railroad Cars, Barges, Trucks, or Stockpiles

D6609 Guide for Part-Stream Sampling of Coal

D7430 Practice for Mechanical Sampling of Coal

¹ This practice is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.21 on Methods of Analysis.

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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.

D7582 Test Methods for Proximate Analysis of Coal and Coke by Macro Thermogravimetric Analysis

3. Terminology

3.1 Definitions:

3.1.1 *proximate analysis of coal and coke*—an assay of the moisture, ash and volatile matter as determined by prescribed methods and the calculation of fixed carbon by difference. Other constituents such as sulfur and characteristics such as gross calorific value are not included.

3.1.2 For additional definitions of terms used in this practice, refer to Terminology D121.

4. Significance and Use

4.1 Test methods, as herein described, can be used to establish the rank of coals, show the ratio of combustible to incombustible constituents, provide the basis for buying and selling, and evaluate for beneficiation or for other purposes.

5. Sampling

5.1 If the proximate analysis is to be used for classification of coal by rank, coal sample collection shall be in accordance with Classification D388. Otherwise, coal sample collection shall be done in accordance with any of the following Guides or Practices as appropriate:

Guide D6609, Practice D4596, Practice D5192, Practice D6883, and Practice D7430. In all other cases, sample collection shall be in accordance with Practice D2234/D2234M.

5.2 Coke sampling shall be done in accordance with Practice D346.

6. Analysis Sample

6.1 For coal, sample preparations shall be in accordance with Practices D2013/D2013M or D7430. The analysis sample shall be the material pulverized to pass a 250 µm (No. 60) sieve in accordance with Practice D2013/D2013M.

6.2 For coke, sample preparations shall be in accordance with Practice D346.

7. Test Methods

7.1 *Moisture*—Test Methods D3173 and D7582.

7.2 *Ash*—Test Methods D3174 and D7582.

7.3 *Volatile Matter*—Test Methods **D3175** and **D7582**. If the modified procedure of **D3175** is required, the report should show that the modified procedure was used.

7.4 *Fixed Carbon*—The fixed carbon is a calculated value. It is the resultant of the summation of percentage moisture, ash, and volatile matter subtracted from 100. All percentages shall be on the same moisture reference base.

$$\begin{aligned} \text{Fixed carbon, \%} &= 100 - (\text{moisture, \%} \\ &+ \text{ash, \%} + \text{volatile matter, \%}) \end{aligned} \quad (1)$$

8. Keywords

8.1 ash; coal; coal rank; coke; fixed carbon; moisture; proximate analysis; volatile matter

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