



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

- D346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis
- D388 Classification of Coals by Rank
- D2013 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

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.

- D4916 Practice for Mechanical Auger Sampling³
- 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
- D7256/D7256M Practice for Mechanical Collection and Within-System Preparation of a Gross Sample of Coal from Moving Streams³

3. Terminology

3.1 Definition:

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

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 Coal sample collection shall be in accordance the sampling section of Classification D388, if the proximate analysis is to be used for classification of coal by rank. Other wise, coal sample collection shall be done in accordance with any of the following Guides or Practices as appropriate: Guide D6609, Practice D4596, Practice D4916, Practice D5192, and Practice D6883. 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.

³ Withdrawn. The last approved version of this historical standard is referenced on www.astm.org.

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

6. Analysis Sample

6.1 For coal, sample preparations shall be in accordance with Practices **D2013** or **D7256/D7256M**. The analysis sample shall be the material pulverized to pass a 250- μm (No. 60 sieve) in accordance with Practice **D2013**.

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

7. Test Methods

7.1 *Moisture*—Test Method **D3173**.

7.2 *Ash*—Test Method **D3174**.

7.3 *Volatile Matter*—Test Method **D3175**. If the modified procedure 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.

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

8. Keywords

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

SUMMARY OF CHANGES

Committee D05 has identified the location of selected changes to this standard since the last issue (D3172–07) that may impact the use of this standard. (Approved Oct. 1, 2007.)

(1) Revisions were made to the Sampling, Section **5** to reflect the availability of the new Standards.

(2) The correct section of Classification **D388** is now refer-

enced with respect to coal sampling.

(3) Revision to the Analysis Sample, Section **6** was made in order to clarify the preparation of coke samples.

Committee D05 has identified the location of selected changes to this standard since the last issue (D3172–89(2002)) that may impact the use of this standard. (Approved May 1, 2007)

(1) A new Section describing the analysis sample was added.

(2) Revisions were made to Sampling, Section **5** to reflect the

availability of new standards.

(3) Keywords section was added.

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