



Standard Test Methods for Determination of Carbon, Hydrogen and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke¹

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1. Scope

1.1 Test Method A covers the determination of carbon in the range of 54.9 % to 84.7 %, hydrogen in the range of 3.25 % to 5.10 %, and nitrogen in the range of 0.57 % to 1.80 % in the analysis samples (8.1) of coal and of carbon in analysis samples of coke in the range of 86.6 % to 97.9 %.

1.1.1 Test Method B covers the determination of carbon in analysis samples of coal in the range of 58.0 % to 84.2 %, and carbon in analysis samples of coke in the range of 86.3 % to 95.2 %.

NOTE 1—The coals included in the interlaboratory study employed to derive the precision statement for this standard cover ASTM rank lignite A to low volatile bituminous. Additional information concerning the composition of these coals appears in [Annex A5](#). The cokes used in the interlaboratory study employed to derive the precision statement for coke for Method A included five each metallurgical (met) cokes and seven each petroleum (pet) cokes, and Method B included an equal number (five each) of met cokes and pet cokes.

1.2 All percentages are percent mass fractions unless otherwise noted.

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 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](#)

¹ These test methods are under the jurisdiction of ASTM Committee [D05](#) on Coal and Coke and are 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.

[D346/D346M Practice for Collection and Preparation of Coke Samples for Laboratory Analysis](#)

[D2013 Practice for Preparing Coal Samples for Analysis](#)

[D3173 Test Method for Moisture in the Analysis Sample of Coal and Coke](#)

[D3176 Practice for Ultimate Analysis of Coal and Coke](#)

[D3180 Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases](#)

[D5865 Test Method for Gross Calorific Value of Coal and Coke](#)

[D7582 Test Methods for Proximate Analysis of Coal and Coke by Macro Thermogravimetric Analysis](#)

2.2 ISO Standard:

[ISO 5725-6 Accuracy \(Trueness and Precision\) of Measurement Methods and Results Part 6: Use in Practice of Accuracy Values³](#)

3. Terminology

3.1 For definitions of terms used in this standard, refer to Terminology [D121](#).

4. Summary of Test Methods

4.1 In Method A, carbon, hydrogen, and nitrogen in coal or carbon in coke are determined in a single instrumental procedure using a furnace operating at temperatures in the range of 900 °C to 1050 °C for carbon, hydrogen and nitrogen in coal or 950 °C to 1150 °C for carbon in coke. The quantitative conversion of the carbon, hydrogen, and nitrogen into their corresponding gases (CO₂, H₂O, and NO_x) occurs during combustion of the sample at an elevated temperature in an atmosphere of oxygen. Combustion products which can interfere with the subsequent gas analysis are removed. Oxides of nitrogen (NO_x) are reduced to N₂ before detection. The carbon dioxide, water vapor and elemental nitrogen in the gas stream are determined by appropriate instrumental detection procedures.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.