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AMERICAN SOCIETY FOR TESTING AND MATERIALS  
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## Standard Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases<sup>1</sup>

This standard is issued under the fixed designation D 3180; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This practice gives formulas to enable analytical data to be expressed on various different bases in common use. Such bases are: as received, dry, equilibrium moisture, dry ash free, and others.

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 this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.3 The values stated in SI units are to be regarded as the standard.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 388 Classification of Coals by Rank<sup>2</sup>
- D 1412 Test Method for Equilibrium Moisture of Coal at 96 to 97 Percent Relative Humidity and 30°C<sup>2</sup>
- D 2013 Method of Preparing Coal Samples for Analysis<sup>2</sup>
- D 3173 Test Method for Moisture in the Analysis Sample of Coal and Coke<sup>2</sup>
- D 3174 Test Method for Ash in the Analysis Sample of Coal and Coke from Coal<sup>2</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *as-determined basis*—analytical data obtained from the analysis sample of coal or coke after conditioning and preparation to No. 60 (250- $\mu$ m) sieve in accordance with Method D 2013. As-determined data represents the numerical values obtained at the particular moisture level in the sample at the time of analysis. These values are normally converted, according to formulae contained herein, to conventional reporting bases.

3.1.2 *as-received basis*—analytical data calculated to the moisture condition of the sample as it arrived at the laboratory and before any processing or conditioning. If the sample has been maintained in a sealed state so that there has been no gain or loss, the as-received basis is equivalent to the moisture basis as sampled.

3.1.3 *dry basis*—data calculated to a theoretical base of no

moisture associated with the sample. The numerical value as established by Test Method D 3173 is used for converting the as-determined data to a dry basis.

3.1.4 *dry, ash-free basis*—data calculated to a theoretical base of no moisture or ash associated with the sample. Numerical values as established by Test Method D 3173 and Test Method D 3174 are used for converting the as-determined data to a moisture- and ash-free basis.

3.1.5 *equilibrium moisture base*—data calculated to the moisture level established as the equilibrium moisture. Numerical values as established by Test Method D 1412 are used for the calculation.

### 4. Significance and Use

4.1 The calculations of analytical data for the coal and coke test parameters listed in Section 6, assume the analysis sample has been prepared according to Method D 2013.

4.2 This practice provides formulas, to enable calculations of data from the as-determined analysis sample to various moisture basis, in common use by the coal and coke industry.

### 5. Applicable Parameters and Symbols Used

5.1 The calculation procedures defined in 6.1.3 and 6.2.2 are applicable to the following analysis parameters when expressed as a weight percentage (except gross calorific value as Btu/lb):

- Ash
- Carbon
- Carbon dioxide
- Chlorine
- Calorific value (gross)
- Fixed carbon
- Nitrogen
- Sulfur
- Sulfur forms (namely, pyritic, sulfate, organic)
- Volatile matter

5.2 The symbols used in this practice:

- $A$  = ash; weight %
- $M$  = moisture, weight %
- $P$  = any analysis parameter listed in 5.1, weight % (except gross calorific value is Btu/lb)
- $ADL$  = air-dry loss, weight % of as-received sample. See Method D 2013.
- $H$  = hydrogen, weight %
- $Ox$  = oxygen, weight %

5.3 Subscripts used in this practice:

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D-5 on Coal and Coke and is the direct responsibility of Subcommittee D05.21 on Methods of Analysis.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 05.05.