



Standard Classification of Coals by Rank¹

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1. Scope

1.1 This standard covers the classification of coals by rank, that is, according to their degree of metamorphism, or progressive alteration, in the natural series from lignite to anthracite.

1.2 This classification is applicable to coals that are composed mainly of vitrinite.

NOTE 1—Coals rich in inertinite or liptinite (exinite), or both, cannot be properly classified because, in those macerals, the properties that determine rank (calorific value, volatile matter, and agglomerating character) differ greatly from those of vitrinite in the same coal. Often such coals can be recognized by megascopic examination. In North America, these coals are mostly nonbanded varieties that contain only a small proportion of vitrain and consist mainly of attrital materials. The degree of metamorphism of nonbanded and other vitrinite-poor coals can be estimated by determining the classification properties of isolated or concentrated vitrinite fractions, or by determining the reflectance of the vitrinite (see Test Method D2798 and Appendix X1 of this classification). However, in the use of these vitrinite-poor coals, some properties normally associated with rank, such as rheology, combustibility, hardness, and grindability (as well as the rank determining properties) may differ substantially from those of vitrinite-rich coals of the same degree of metamorphism.

The precision of the classification of impure coal may be impaired by the effect of large amounts of mineral matter on the determination of volatile matter and calorific value, and on their calculation to the mineral-matter-free basis.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3.1 *Exception*—The values stated in British thermal units per pound are to be regarded as the standard. The SI equivalents of British thermal units per pound are approximate.

2. Referenced Documents

2.1 ASTM Standards:²

D121 Terminology of Coal and Coke

¹ This classification is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.18 on Classification of Coals.

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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.

D720 Test Method for Free-Swelling Index of Coal
D1412 Test Method for Equilibrium Moisture of Coal at 96 to 97 Percent Relative Humidity and 30°C
D2013 Practice for Preparing Coal Samples for Analysis
D2234/D2234M Practice for Collection of a Gross Sample of Coal
D2798 Test Method for Microscopical Determination of the Vitrinite Reflectance of Coal
D3172 Practice for Proximate Analysis of Coal and Coke
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
D3302 Test Method for Total Moisture in Coal
D4239 Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion
D4596 Practice for Collection of Channel Samples of Coal in a Mine
D5016 Test Method for Total Sulfur in Coal and Coke Combustion Residues Using a High-Temperature Tube Furnace Combustion Method with Infrared Absorption
D5192 Practice for Collection of Coal Samples from Core
D5865 Test Method for Gross Calorific Value of Coal and Coke

3. Terminology

3.1 Definitions:

3.1.1 For additional definitions of terms used in this classification, refer to Terminology D121.

3.1.2 *agglomerating*, *adj*—as applied to coal, the property of softening when it is heated to above about 400°C in a nonoxidizing atmosphere, and then appearing as a coherent mass after cooling to room temperature.

3.1.3 *apparent rank*, *n*—of coal, the rank designation obtained on samples other than channel samples or core samples with 100 % recovery, but otherwise conforming to procedures of Classification D388.

3.1.4 *coal seam*, *n*—the stratum, layer, or bed of coal that lies between two other rock layers whose compositions differ significantly from that of coal.