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Standard Practice for Mechanical Collection and Within-System Preparation of a Gross Sample of Coal from Moving Streams[1]

This standard is issued under the fixed designation D 7256 / D 7256M; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

Analysis data obtained from coal samples are used in establishing price, controlling mine and cleaning plant operations, allocating production costs, and determining plant or component efficiency. The task of obtaining a sample of reasonable weight to represent an entire lot presents a number of problems and emphasizes the necessity for using standard sampling procedures.

Coal is one of the most difficult of materials to sample, varying in composition from noncombustible particles to those which can be burned completely, with all gradations in between. The task is further complicated by the use of the analytical results, the sampling equipment available, the quantity to be represented by the sample, and the degree of precision required.

This practice gives the overall requirements for the collection and within-system preparation of coal samples through the use of mechanical sampling systems. The wide varieties of coal-handling facilities preclude the publication of detailed procedures for every sampling situation. The proper collection of the sample involves an understanding and consideration of the physical character of the coal, the number and weight of increments, and the overall precision required.

1. Scope

1.1 This practice covers procedures for the mechanical collection of a sample under Classification I-B-1 and I-B-2 (Practice D 2234/D 2234M) and the within-system preparation (reduction and division) of gross samples utilizing various components of the mechanical sampling system.

1.2 This practice describes mechanical sampling procedures for coals *(1)* by size and condition of preparation (for example, mechanically cleaned coal or raw coal) and *(2)* by sampling characteristics.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the text the inch-pound units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, use each system independently of the other. Combining values from the two systems may result in nonconformance with the 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]

D 121 Terminology of Coal and Coke
D 2013 Practice for Preparing Coal Samples for Analysis
D 2234/D 2234M Practice for Collection of a Gross Sample of Coal
D 4702 Practice for Quality Management of Mechanical Coal Sampling Systems
D 6518 Practice for Bias Testing a Mechanical Coal Sampling System
E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
E 456 Terminology Relating to Quality and Statistics

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*—Many terms used in this practice may be found in Terminologies D 121 and E 456 and in Practice E 177.

3.1.1 *activation interval*—for a falling-stream or cross-belt cutter, the time from the beginning of movement for taking an increment, to the beginning of movement for taking of the next increment.

[1] This practice is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.23 on Sampling.

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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.

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3.1.2 *cross-belt sampler*—a single sampling machine or component of a mechanical sampling system designed to extract an increment directly from a conveyor belt surface by sweeping a sampling device (cutter) through the material on the conveyor.

3.1.3 *falling-stream sampler*—a single sampling machine or component of a mechanical sampling system designed to extract an increment from a falling stream of coal at the discharge end of a conveyor or chute by moving a sampling device (cutter) through the falling stream of material.

3.1.4 *mechanical sampling system*—a single machine or series of interconnected machines whose purpose is to extract mechanically, or process (divide and reduce), or a combination thereof, a sample of coal.

3.1.5 *within-system preparation*—the process of gross sample preparation carried out mechanically by sequential crushing (reduction) equipment and/or division equipment. It may be carried out by processing increments individually or by batching increments together and processing them together as a group. In any case, within-system preparation is conducted in a manner to minimize moisture changes and without removing the gross sample or its increments from the sampling system.

4. Summary of Practice

4.1 The general-purpose sampling procedures are intended to provide, in 19 of 20 cases, dry ash results that are within an interval of ±1/10 of the average dry ash results that would be obtained in hypothetical repeated sampling.

4.2 Special-purpose sampling procedures apply to the sampling of coal when other precision limits are required, or when other constituents are used to specify precision, or for performance tests.

4.3 For coals of known size and condition of preparation, a table (Table 1) is given for the determination of the number and weight of increments required for a gross sample for both general- and special-purpose sampling.

4.4 The only processes of sample division and reduction covered in this document are the use of mechanical sample dividers for the division of the sample, and mechanical crushing equipment for the reduction of the sample, both of which are within-system components of the mechanical sampling system.

4.5 The procedures appear in the following order:

Test Method	Section
Sampling of Coals Based on Size and Condition of Preparation	8.1
General-Purpose Sampling Procedure	8.1.1
Number and Weight of Increments	8.1.1.2
Number of Gross Samples	8.1.1.4
Special-Purpose Sampling	8.1.2
Number and Weight of Increments	8.1.2.2
Number of Gross Samples	8.1.2.3
Division of the Gross Samples Before Crushing	8.2
Reduction and Division	8.3

5. Significance and Use

5.1 It is intended that this practice be used to provide a sample representative of the coal from which it is collected. Because of the variability of coal and the wide variety of mechanical sampling equipment available, caution should be used in all stages of the sample collection process, the design of sampling system specifications, the equipment procurement and the acceptance testing of installed equipment.

5.2 After removal from the sampling system and further preparation (Practice D 2013), the sample may be analyzed for a number of different parameters. These parameters may define the lot's value, its ability to meet specifications, its environmental impact, as well as other properties.

6. Increment Collection Classification

6.1 The type of selection, the conditions under which individual increments are collected, and the method of spacing of increments from the coal consignment or lot are classified according to the following descriptions and Table 1 in Practice D 2234/D 2234M.

6.2 *Types of Increments*—the only type of selection of increments covered by this document are Type I where there is no human discretion in the selection of the pieces of coal or portions of the coal stream. Type I selection increments generally yield more accurate results than Type II where human discretion is exercised in the selection of specific pieces of coal or of specific portions of the stream, pile, or shipment.

6.3 *Conditions of Increment Collection*—The conditions under which individual increments are collected are the conditions of the main body of coal relative to the portion withdrawn. Only Condition B (Full-Stream Cut), in which a full cross-section cut is removed from a moving stream of coal is covered by this document.

6.4 *Spacing of Increments*—The spacing of increments pertains to the kind of intervals between increments. Two spacing methods are recognized: systematic and random. Systematic spacing is usually preferable.

TABLE 1 Number and Weight of Increments for General-Purpose Sampling Procedure[A]

Top Size	16 mm [5/8 in.]	50 mm [2 in.]	150 mm [6 in.][B]
Mechanically Cleaned Coal[C]			
Minimum number of increments	15	15	15
Minimum weight of increments, kg [lb]	1 [2]	3 [6]	7 [15]
Raw (Uncleaned Coal)[C]			
Minimum number of increments	35	35	35
Minimum weight of increments, kg [lb]	1 [2]	3 [6]	7 [15]

[A] Conditions C and D are not addressed in this standard.
[B] For coals above 150-mm [6-in.] top size, the sampling procedure should be mutually agreed upon in advance by all parties concerned.
[C] See 7.2.2, Condition of Preparation.

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