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Standard Practice for Collection and Preparation of Coke Samples for Laboratory Analysis¹

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INTRODUCTION

Coke, especially run of oven coke or foundry coke, or both, is a difficult material to sample. It is imperative that every sample be collected and handled carefully and conscientiously and in strict accordance with the standard procedure described herein.

Gross samples of not less than the quantities designated in this practice must be taken, whether the coke to be sampled consists of a few tons or several hundred tons.

1. Scope

1.1 This practice covers procedures for the collection and reduction of samples of coke to be used for physical tests, chemical analyses, and the determination of total moisture.

~~1.2 The values given in SI units are to be regarded as the standard. The values given in parentheses are for information only.~~

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.2.1 Values in SI units [or inch-pound units] shall be obtained by measurement in SI units [or inch-pound units] or by appropriate conversion, using the Rules for Conversion and Rounding given in IEEE/ASTM SI 10, of measurements made in other units [or SI units]. Values are state ins SI units when inch-pound units are not used in practice.

1.3 *This standard does not purport to address the safety concerns 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

D167 Test Method for Apparent and True Specific Gravity and Porosity of Lump Coke

D293 Test Method for the Sieve Analysis of Coke

D2013 Practice for Preparing Coal Samples for Analysis

D2234/D2234M Practice for Collection of a Gross Sample of Coal

D3038 Test Method for Drop Shatter Test for Coke

D3302 Test Method for Total Moisture in Coal

D3402 Test Method for Tumbler Test for Coke

~~D6883 Practice for Manual Sampling of Stationary Coal from Railroad Cars, Barges, Trucks, or Stockpiles~~

IEEE/ASTM SI 10 American National Standard for Metric Practice

3. Significance and Use

3.1 This practice may be used to provide a representative sample of the coke from which it is collected. Because of the variability of coke and the wide variety of sampling equipment, caution must be exercised in all stages of sampling, from system specifications and equipment procurement to equipment acceptance testing and actually taking the final sample.

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. Current edition approved May 1, 2010. Published May 2010. Originally approved in 1932. Last previous edition approved in 2004 as D346-04 ^{ε1}. DOI: 10.1520/D0346-04R10.

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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.

3.2 This practice also provides an analysis sample of coke from the gross or divided sample. The analysis samples can be used to determine the value of the coke represented, its ability to meet specifications, as well as for other purposes.

4. Place of Sampling

4.1 Sample coke while it is being loaded into or unloaded from railroad cars, ships, barges, or trucks, or when discharged from supply bins, grab buckets, belt conveyers, or other coke conveying equipment. Sample close to the point of interest.

5. Collection of Gross Sample

5.1 Collect increments regularly, systematically, and with such frequency, so that the entire quantity of coke sampled will be represented proportionately in the gross sample, and a gross sample of the required amount will be collected. The standard gross sample shall equal or exceed the quantities given in Table 1.

5.1.1 The quantity of sample to be taken will depend on the type and size of the coke being sampled and the amount of information to be obtained from the sample.

5.1.1.1 The size of the sieve analysis sample is governed by the homogeneity of the coke being sampled. The quantities given in Table 1 represent the minimum quantity to be collected. The sieve analysis sample will supply sufficient coke for any subsequent physical tests and laboratory analysis. Total moisture of the coke should not be determined on the sieve analysis sample.

5.1.1.2 For the drop shatter test, a minimum of 75 kg (~~165 lb~~)[165 lb] of coke retained on 50-mm (~~2-in.~~)[2-in.] square mesh sieve if furnace coke is being processed, or 140 kg (~~300 lb~~)[300 lb] of coke retained on 75-mm (~~3-in.~~)[3-in.] square mesh sieve if foundry coke is being processed, is required. The quantities given in Table 1 represent the minimum amounts required of sized coke.

5.1.1.3 The tumbler test requires a minimum of 35 kg (~~75 lb~~)[75 lb] of coke that will pass a 75-mm (~~3-in.~~)[3-in.] square mesh sieve and can be retained on a 50-mm (~~2-in.~~)[2-in.] square mesh sieve, or that which will pass a 64-mm (~~2 1/2-in.~~)[2 1/2-in.] square mesh sieve and can be retained on a 38-mm (~~1 1/2-in.~~)[1 1/2-in.] square mesh sieve. The quantities given in Table 1 represent the minimum amount of the required sized coke.

5.1.1.4 The apparent specific gravity test required a minimum of 23 kg (~~50 lb~~)[50 lb] of representative coke pieces. The quantities given in Table 1 represent the minimum amounts of the required coke pieces.

5.1.1.5 The determination of total moisture of the coke requires approximately 45 kg (~~100 lb~~)[100 lb] of coke. The quantities given in Table 1 represent the minimum amount to be collected.

5.1.1.6 The quantities given for samples for chemical analysis represent the minimum amounts to be collected.

NOTE 1—Samples collected from the surface of coke in piles, bins, cars, ships, or barges are, in general, unreliable because of size segregation and should not be used for determining conformance to specifications unless the purchaser and the seller so agree. If necessary to collect a sample of coke from the surface of a loaded railroad car, take nine equal increments about 305 mm (~~1 ft~~)[1 ft] below the surface. Locate the nine points as shown in Fig. 1. The diameter of the hole must be at least 3 times that of the largest piece in the shipment.

6. Condition of Increment Collection

6.1 Four conditions of increment collection are recognized:

6.1.1 *Condition A (Stopped-Belt Cut)*, in which a loaded conveyor belt is stopped and a full cross-section cut with parallel sides is removed from the coke stream. The distance between the parallel faces shall not be less than three times the length of the largest piece.

6.1.2 *Condition B (Full-Stream Cut)*, in which a full cross section is removed from a moving stream of coke.

6.1.3 *Condition C (Part-Stream Cut)*, in which a portion, not a full cross section, is removed from a moving stream of coke.

6.1.4 *Condition D (Stationary Sampling)*, in which a portion of coke is collected from a pile, a railroad car, a barge, or a shiphold.

NOTE 2—See Section 6 of Practice D2234/D2234M.

TABLE 1 Minimum Gross Sample Weights of Coke, kg-([lb])

Usage	Foundry Coke		Furnace Coke		Coke Breeze ^A
	Run of Oven	Sized	Run of Oven	Sized	
Sieve analysis (size consist)	364 (800)	227 (500)	227 (500)	182 (400)	45 (100)
Sieve analysis (size consist)	364 [800]	227 [500]	227 [500]	182 [400]	45 [100]
Drop shatter test	182 (400)	159 (350)	136 (300)	91 (200)	...
Drop shatter test	182 [400]	159 [350]	136 [300]	91 [200]	...
Tumbler test	68 (150)	45 (100)	57 (125)	57 (125)	...
Tumbler test	68 [150]	45 [100]	57 [125]	57 [125]	...
Apparent specific gravity	46 (100)	46 (100)	46 (100)	46 (100)	23 (50)
Apparent specific gravity	46 [100]	46 [100]	46 [100]	46 [100]	23 [50]
Coke moisture	46 (100)	46 (100)	46 (100)	46 (100)	23 (50)
Coke moisture	46 [100]	46 [100]	46 [100]	46 [100]	23 [50]
Chemical analysis	113 (250)	113 (250)	57 (125)	57 (125)	34 (75)
Chemical analysis	113 [250]	113 [250]	57 [125]	57 [125]	34 [75]

^A Coke passing a 19-mm [~~3/4-in.~~](19-mm)] square hole sieve or smaller top size.