



Designation: **D8145–18** **D8145 – 23**

## Standard Practice for Sampling of Green Petroleum Coke<sup>1</sup>

This standard is issued under the fixed designation D8145; 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

Green petroleum coke is a byproduct of certain oil refining technologies but has multiple uses, such as a solid mineral fuel or a key constituent of making anodes. The chemical and physical characteristics of green petroleum coke, particularly the moisture content, are not always distributed equally in the different sized particles. As such, the sampling of green petroleum coke must follow the general sampling principals of capturing the particle size distribution of the consignment into the gross sample that is collected to represent it.

Green petroleum coke sampling has relied on the sampling standards for Coal and Coke under ASTM Subcommittee D05.05 for guidance on how to collect and prepare samples, in particular, Practice **D2234/D2234M** for the Collection of a Gross Sample of Coal, Practice **D2013/D2013M** for the Preparation of Coal Samples for Analysis, and Practice **D346** for the Collection and Preparation of Coke Samples for Laboratory Analysis have been used, among others. With the growing use of mechanical sampling equipment, Practice **D7430** for the Mechanical Sampling of Coal has been added to the mix. The above cited standards are useful, but do not account for some of the unique characteristics of petroleum coke, which has led to widespread confusion as to which parts are applicable, especially Practice **D346**, which is really used for coke made from coal and not from petroleum refining.

This practice gives guidelines for the user on how to sample green petroleum coke. The intent is not to write a standalone standard for green petroleum coke but to direct the user as to how to apply the D05.05 coal standards already in existence.

<https://standards.nich.gov/catalog/standards/siv/073ab242-600e-4c2a-ba00-5e35f08d0e52/astm-d8145-23>

### 1. Scope-Scope\*

1.1 This practice primarily references Practice **D2234/D2234M** and applies its sampling principles to green petroleum coke. Green petroleum coke is typically more homogeneous than coal and this practice provides specific guidance for the application of D05.05 coal standards to the sampling of green petroleum coke.

1.1.1 Practice **D2234/D2234M** references the four conditions of collecting sample increments: Condition A (Stopped Belt Cut), Condition B (Full-stream Cut), Condition C (Part-stream Cut), and Condition D (Stationary Sampling). This practice directs the user to the appropriate coal standard to apply to each condition, as well as key considerations.

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

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee **D02** on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee **D02.05** on Properties of Fuels, Petroleum Coke and Carbon Material.

Current edition approved May 1, 2018; July 1, 2023. Published July 2018; October 2023. Originally approved in 2018. Last previous edition approved in 2018 as D8145 – 18. DOI: [10.1520/D8145-18](https://doi.org/10.1520/D8145-18); [10.1520/D8145-23](https://doi.org/10.1520/D8145-23).

\*A Summary of Changes section appears at the end of this standard

1.3 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- D121 Terminology of Coal and Coke
- D346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis
- D2013/D2013M Practice for Preparing Coal Samples for Analysis
- D2234/D2234M Practice for Collection of a Gross Sample of Coal
- D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants
- D5709 Test Method for Sieve Analysis of Petroleum Coke
- D6609 Guide for Part-Stream Sampling of Coal
- D6883 Practice for Manual Sampling of Stationary Coal from Railroad Cars, Barges, Trucks, or Stockpiles
- D7430 Practice for Mechanical Sampling of Coal
- E456 Terminology Relating to Quality and Statistics

## 3. Terminology

3.1 *Definitions*—Definitions applicable to this practice are listed in Terminology **D121**.

### 3.1 *Definitions of Terms Specific to This Standard: Definitions:*

3.2.1 *cross-belt sampler, n*—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.

3.1.1 For definitions of terms used in this practice, refer to Terminologies **D121** and **D4175**.

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

3.2.3 *increment, n*—a small portion of a lot collected by one operation of a sampling device and normally combined with other increments from the lot to make a gross sample.

3.2.4 *judgment sampling, n*—a procedure whereby enumerators select a few items of the population, based on visual, positional, or other cues that are believed to be related to the variable of interest, so that the selected items appear to match the population.

#### 3.2.4.1 *Discussion*—

In the case of sampling green petroleum coke, this statistical terminology from Terminology **E456** is stating that the enumerator (human sampler) selects items from the population (collects sample increments) based on various cues (time/tonnage, at transfer point, etc.) so that the items (sample increments) appear to match the population (representative sample). The key dynamic here is that the sampler is attempting to collect a representative sample using their best judgment as to when and how to collect increments when, (a) so many particles in the consignment have a zero chance of being selected; and (b) there is no sure way to overcome particle size segregation in the material.

3.2.5 *mechanical sampling system, n*—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 green petroleum coke.

3.2.6 *nonprobability sample, n*—a sample of which the sampling units have not been selected in a manner that satisfies the minimum requirements of probability sampling.

#### 3.2.6.1 *Discussion*—

No meaningful statistical inference can be made with data obtained by a nonprobability sample. No meaningful statement can be made concerning the precision, standard error, or bias of the sample.

<sup>2</sup> 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.