



Designation: D3997/D3997M – 97(Reapproved 2009)

## Standard Practice for Preparing Coke Samples for Microscopical Analysis by Reflected Light<sup>1</sup>

This standard is issued under the fixed designation D3997/D3997M; 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 covers laboratory procedures for the preparation of granular samples of coke for examination with a reflected light microscope. The samples prepared are used for identifying and quantifying the textural components in coke. This practice does not apply to the preparation of oriented lump specimens of coke for structural analysis.

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.

1.3 *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:*<sup>2</sup>

**D121 Terminology of Coal and Coke**

**D346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis**

**D5061 Test Method for Microscopical Determination of the Textural Components of Metallurgical Coke**

**E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves**

### 3. Terminology

3.1 *Definitions:*

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.28 on Petrographic Analysis of Coal and Coke.

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<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.

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

3.1.2 *briquette, n*—a cylindrical block composed of granulated coal or coke particles compressed and embedded with an epoxy binder.

### 4. Summary of Practice

4.1 A representative sample is crushed to a specified particle size, oven-dried, mixed with a binder, and formed into a block specimen referred to as a briquette. The briquette is then polished to a flat, scratch-free surface for microscopical examination under reflected light.

### 5. Significance and Use

5.1 Briquettes of granular coke prepared in accordance with the laboratory procedures of this practice will have flat, scratch-free surfaces suitable for examination with a microscope using reflected light illumination. The polished surface of briquettes prepared using this practice will contain particles representative of the original gross sample.

5.2 Samples prepared by this practice are used for microscopical determination of the textural components in coke (see Test Method **D5061**).

### 6. Apparatus

6.1 *Grinder, Pulverizer, Mill, or Jaw Crusher*, or other suitable equipment for final crushing of the sample to pass a 2.36-mm (No. 8) sieve.

6.2 *Coarse Riffle Sampler*, with at least twelve divisions of not less than 12.7 mm [ $\frac{1}{2}$  in.] and not greater than 19.1 mm [ $\frac{3}{4}$  in.].

6.3 *Medium Riffle Sampler*, with at least twelve divisions of not less than 6.4 mm [ $\frac{1}{4}$  in.] and not greater than 12.7 mm [ $\frac{1}{2}$  in.].

6.4 *Sieves*—A 6.4-mm [ $\frac{1}{4}$ -in.] and 2.36-mm (No. 8) U.S.A. Standard Sieve (see Specification **E11**).

6.5 *Molds*—Containers to hold the coke/binder mixture while the binder hardens. Generally, steel cylindrical molds are used (see **Fig. 1**). However, it is acceptable to use other mold materials that successfully yield the same type of briquette.