



Standard Test Method for Laboratory Froth Flotation of Coal in a Mechanical Cell¹

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INTRODUCTION

Froth flotation of coal, the separation of ash-bearing minerals from combustibles via differences in surface chemistry, has been steadily increasing in use as a means to treat 600- μm (No. 30 U.S.A. Standard Sieve Series) or finer coal. The process is one in which many variables need to be monitored and regulated. Because of this complexity, rigorous laboratory testing is difficult to standardize.

This test method outlines the types of equipment and procedures to apply on a laboratory scale to isolate key process variables and minimize the variations associated with the design and execution of a froth flotation test. The objective of the test method is to develop a means by which repeatable grade/recovery results are ascertained from froth flotation testing of coal without imposing unnecessary limitations on the applicability of the test results in coal preparation practice.

It is recognized that sample preparation, particularly comminution, has a significant impact on froth flotation response. This test method does not attempt to define sample preparation and size reduction practices as part of a froth flotation testing program.

This test method also does not completely cover specific procedures for the investigation of flotation kinetics. Such a test is specialized and is highly dependent upon the end use of the data.

1. Scope

1.1 This test method covers a laboratory procedure for conducting a single froth flotation test on fine coal (that is, nominal top size of 600 μm (No. 30 U.S.A. Standard Sieve Series) or finer) using a defined set of starting point conditions for the operating variables.

1.2 This test method does not completely cover specific procedures for the investigation of flotation kinetics. Such a test is specialized and highly dependent upon the objective of the data.

1.3 Since optimum conditions for flotation are usually not found at the specified starting points, suggestions for development of grade/recovery curves are given in [Appendix X1](#). Such a procedure is very case-specific and involves running a series of flotation tests in which some of the operating variables are changed in order to optimize conditions for either yield or grade.

1.4 Laboratory flotation results need not be representative of the flotation response of coal in full-scale situations, but a

consistent baseline can be established against which full-scale performance can be compared.

1.5 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.

1.6 *This standard does not purport to address 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.*

1.7 Material Safety Data Sheets (MSDS) for reagents used are to be obtained from suppliers who are to be consulted before work with any chemicals used in this test method.

2. Referenced Documents

2.1 *ASTM Standards:*²

[D121 Terminology of Coal and Coke](#)

[D2013 Practice for Preparing Coal Samples for Analysis](#)

¹ This test method is under the jurisdiction of ASTM Committee [D05](#) on Coal and Coke and is the direct responsibility of Subcommittee [D05.07](#) on Physical Characteristics of Coal.

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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.