



Standard Test Method for Total Mercury in Coal and Coal Combustion Residues by Direct Combustion Analysis¹

This standard is issued under the fixed designation D 6722; 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.

1. Scope

1.1 These test methods cover procedures to determine the total mercury content in a sample of coal or coal combustion residue.

1.2 The values stated in SI units are regarded as 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:

D 121 Terminology of Coal and Coke²

D 2013 Method of Preparing Coal Samples for Analyses²

D 3173 Test Method for Moisture in the Analysis Sample of Coal and Coke²

D 3180 Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases²

D 4621 Guide for Accountability and Quality Control in the Coal Analysis Laboratory²

D 5142 Test Methods for the Proximate Analysis of the Analysis Sample of Coal and Coke by Instrumental Procedures²

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System³

3. Terminology

3.1 For definitions of terms used in this standard, refer to Terminology D 121.

4. Summary of Test Method

4.1 Controlled heating of the analysis sample in oxygen is used to liberate mercury. The sample is heated to dryness in the

instrument and then thermally and chemically decomposed. The decomposition products are carried by flowing oxygen to the catalytic section of the furnace, where oxidation is completed and halogens as well as nitrogen and sulfur oxides are trapped. The remaining decomposition products are carried to a gold amalgamator that selectively traps mercury. After the system is flushed with oxygen to remove any remaining decomposition products, the amalgamator is rapidly heated, releasing mercury vapor. Flowing oxygen carries the mercury vapor through absorbance cells positioned in the light path of single wavelength atomic absorption spectrophotometer. Absorbance peak height or peak area, as a function of mercury concentration, is measured at 253.7 nm.

NOTE 1—Mercury and mercury salts can be volatilized at low temperatures. Precautions against inadvertent mercury loss should be taken when using this method.

5. Significance and Use

5.1 The emission of mercury during coal combustion can be an environmental concern.

5.2 When representative test portions are analyzed according to this procedure, the total mercury is representative of concentrations in the sample.

6. Apparatus

6.1 There are several configurations of the instrumental components that can be used satisfactorily for this test method. Functionally, the instrument shall have the following components: drying compartment, decomposition tube, catalyst tube, gold amalgamator, amalgamator furnace, measuring cuvettes, mercury lamp, and detector. The following requirements are specified for all approved instruments. (Note 2).

NOTE 2—The approval of an instrument with respect to these functions is paramount to this test method, since such approval tacitly provides approval of both the materials and the procedures used with the system to provide these functions.

6.1.1 The instrument shall be capable of drying the sample once it is weighed and introduced.

¹ This test method is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.29 on Major Elements in Ash and Trace Elements of Coal.

Current edition approved October 10, 2001. Published December 2001.

² *Annual Book of ASTM Standards*, Vol 05.06.

³ *Annual Book of ASTM Standards*, Vol 14.02.