Designation: D 2961 – 95a

Standard Test Method for Total Moisture in Coal Reduced to 2.36-mm (No. 8) Mesh Top Sieve Size (Limited-Purpose Method)[1]

This standard is issued under the fixed designation D 2961; 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 This test method covers a single-stage procedure for the determination of total moisture in coal reduced to 2.36- mm mesh (No. 8). It is recognized that the conditions of the test can increase the potential for significant oxidation effects. Materials subjected to this test shall not be used in the determination of other test parameters. If the oxidation potential is of concern, the use of this single-stage method shall involve prior agreement between the parties involved. This test method shall not be construed as the standard test method for total moisture. For referee purposes, users of this test method are referred to Test Method D 3302 for moisture determination methods which are not as susceptible to oxidation effects.

NOTE 1—If the oxidation potential is of concern, the use of this single-stage method should involve prior agreement between the parties involved.

1.2 The values stated in SI units are to be 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 2013 Test Method of Preparing Coal Samples for Analysis[2]

D 3302 Test Method for Total Moisture in Coal[2]

3. Summary of Test Method

3.1 Moisture is determined by establishing the weight loss of the coal sample by drying in an oven with forced-air circulation.

4. Significance and Use

4.1 The measurement of total moisture is required to determine whether coal meets commercial or environmental specifications, or both. Within the limitations prescribed in the scope, this test method describes a procedure for determination of total moisture that requires less time than the procedures described in Test Method D 3302.

5. Apparatus

5.1 *Drying Pans*, noncorrodible, stable at the temperature used, and of such size that the sample can be spread to a depth of not more than 25 mm (1 in.).

5.1.1 The pan size may be varied to suit the size of the sample and the oven. The height of the sides shall be no more than 40 mm (1½ in.) so that air is not restricted in passing over the coal.

5.2 *Drying Oven*, forced air-type capable of maintaining a temperature of 107 ± 3°C and constructed to provide for a continuous air flow to all parts of the oven.

6. Sampling

6.1 The sample shall be prepared according to Test Method D 2013 except that the 500 g portion can be further subdivided to 125 g.

6.2 That portion of the sample used for the moisture determination shall have a minimum weight of 125 g.

7. Procedure

7.1 Weigh the empty drying pan. Record the mass in grams as W_1. Transfer the sample from the sample container to the drying pan. Distribute the sample uniformly over the pan. Do not exceed a depth of 25 mm (1 in.). Place the empty sample container in the drying pan. Weigh the drying pan, coal sample, and empty sample container. Record the mass in grams as W_3.

7.2 Place the pan, sample, and empty sample container in the oven at a temperature of 107 ± 3°C. Maintain the air flow to provide continuous introduction of air while ensuring that fine particles are not elutriated. Dry for 1½ h, remove from the oven, and weigh immediately. Record the mass.

7.3 Return to the oven for an additional ½ h, remove, and weigh. Record the mass. Repeat the drying at ½-h intervals until the change in mass for the ½-h period is less than 0.05 % of the original mass of the coal sample. Record the minimum mass of the dried pan, sample, and container as W_4.

7.4 Remove any residual coal from the dried sample container and weigh the empty container. Record the mass as W_2.

NOTE 2—If the moisture determination is to be made in the immediate

[1] This test method is under the jurisdiction of ASTM Committee D-5 on Coal and Coke and is the direct responsibility of Subcommittee D05.21 on Methods of Analysis.

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[2] *Annual Book of ASTM Standards*, Vol 05.05.

vicinity of sample preparation, the sample need not be placed in a container, but can be weighed directly in a tared drying pan.

8. Calculation

8.1 Calculate the moisture content of the sample as follows:

$$M = [(W_3 - W_4)/(W_3 - W_1 - W_2)] \times 100 \quad (1)$$

where:

M = total moisture in the coal as analyzed, %,
W_1 = weight of empty pan,
W_2 = weight of empty sample container,
W_3 = weight of coal plus pan plus sample container wet, and
W_4 = weight of coal plus pan plus sample container after drying.

9. Precision and Bias

NOTE 3—The precision for the 125 gram sample has not been established. The 125 gram sample split has not been evaluated above 10.23 % Total Moisture. Use of this test method at 125 g sample size for coals >10.23 % total moisture should be considered carefully.

9.1 *Repeatability*—Results of duplicate moisture determinations carried out on the same sample in the same laboratory by the same operator using the same equipment should not differ by more than 0.30 %.

9.2 *Reproducibility*—The means of results of duplicate moisture determinations carried out by different laboratories on different portions of the same sample should not differ by more than 0.50 %.

9.3 *Bias*—Bias of this test method has not been determined.