Designation: D 2866 – 94 (Reapproved 1999)

Standard Test Method for Total Ash Content of Activated Carbon[1]

This standard is issued under the fixed designation D 2866; 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 describes a procedure for the determination of total ash content of activated carbon.

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 and health practices and deterrmine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 2867 Test Methods for Moisture in Activated Carbon[2]

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods[3]

E 691 Practice for Conducting an Interlaboratory Study to Determine Precision of a Test Method[3]

3. Summary of Test Method

3.1 An accurately weighed sample of dried activated carbon is placed in a controlled-temperature muffle furnace for a period of several hours. When constant weight has been achieved, the crucible is cooled to ambient temperature in a desiccator and reweighed. The weight of the ashed carbon is expresesed as a percentage of the weight of the original carbon sample.

4. Significance and Use

4.1 In specific end uses, the amount and composition of the ash may influence the capabilities and certain desired properties of activated carbon.

5. Apparatus

5.1 *Muffle Furnace*, having air circulation, capable of temperature regulation of ±25°C at 650°C.

5.2 *High-Temperature Crucible*, high-form.

5.3 *Analytical Balance*, having a sensitivity of 0.1 mg.

5.4 *Desiccator*.

5.5 *Oven*, forced-air circulation, capable of temperature regulation between 145 and 155°C.

6. Procedure

6.1 Ignite the crucible in the muffle furnace at 650± 25°C for 1 h. Place the crucible in the desiccator. Cool to room temperature and weigh to the nearest 0.1 mg.

6.2 Dry an adequate sample of activated carbon to constant weight at 150 ± 5°C (3 h is usually sufficient).

NOTE 1—Some carbons can ignite spontaneously at 150°C. In this case, moist carbon should be used with a correction for moisture (in accordance with Methods D 2867) applied in the calculations. In this case, the ashing should be started in a cold muffle furnace.

6.3 Weigh out to the nearest 0.1 mg sufficient dried activated carbon, so that the estimated amount of ash will be 0.1 g, into the ignited crucible and place the crucible in the furnace at 650 ± 25°C. Ashing will require from 3 to 16 h, depending on the size and type of activated carbon. Ashing can be considered complete when constant weight is achieved.

6.4 Place the crucible in the desiccator and allow to cool to room temperature. After the sample has cooled in the desiccator, admit air slowly to avoid loss of ash from the crucible. Weigh to the nearest 0.1 mg.

7. Calculation

7.1 Calculate the ash content as follows:

$$\text{Total ash, \%} = [(D - B)/(C - B)] \times 100 \quad (1)$$

where:

B = weight of crucible, g,

C = weight of crucible plus original sample, g, and

D = weight of crucible plus ashed sample, g.

8. Precision and Bias [4]

8.1 *Precision*:

8.1.1 *Interlaboratory Test Program*—An interlaboratory study was run in which representative samples of three types of activated carbon (coconut-shell based (*A*), coal-based (*B*), and wood-based (*C*)) were testerd for ash content by six laboratories with each laboratory making three observations of each activated carbon type over three days. Practice E 691 was

[1] This test method is under the jurisidiction of ASTM Committee D-28 on Activated Carbon and is the direct responsibility of Subcommittee D28.04 on Gas Phase Evaluation Tests.

Current edition approved Feb. 15, 1994. Published April 1994. Originally published D 2866 – 70. Last previous edition D 2866 – 83 (1988).

[2] *Annual Book of ASTM Standards*, Vol 15.01.

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

[4] Supporting data have been filed at ASTM Headquarters and may be obtained by requesting RR: D 28-1004.

followed for the design and analysis of the data.

8.1.2 *Test Result*—The precision information given in Table 1 in units of measurement (percent minus weight ash content) is for the comparison of two test results, each of which is the average of three test determinations.

TABLE 1 Precision

Material	A	B	C
Average Test Value	7.74	1.88	4.61
95 % Repeatability Limit[A] (Within Laboratory)	0.27	0.22	0.22
95 % Reproducibility Limit[A] (Between Laboratories)	0.41	0.54	0.48

[A] The terms *repeatability limit* and *reproducibility limit* are used in accordance with Practice E 177. The respective standard deviations among test results may be obtained by dividing the above limit values by 2.8.