Designation: E1534 – 93 (Reapproved 2013)

Standard Test Method for Determination of Ash Content of Particulate Wood Fuels[1]

This standard is issued under the fixed designation E1534; 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 the determination of ash expressed as the percent of residue remaining after dry oxidation of particulate wood fuels. Particulate wood fuels are defined in Terminology E1126.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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:*[2]

D3180 Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases

E871 Test Method for Moisture Analysis of Particulate Wood Fuels

E1126 Terminology Relating to Biomass Fuels (Withdrawn 2003)[3]

3. Terminology

3.1 For additional information, see Terminology E1126.

4. Summary of Test Method

4.1 Ash content is determined by establishing the weight loss of the sample when heated under rigidly controlled conditions of temperature, time, sample weight, and equipment specifications.

5. Significance and Use

5.1 The ash content determines the weight of the noncombustible part of a particulate wood fuel that oxidizes during a combustion process but releases no energy.

6. Apparatus

6.1 *Crucibles,* having a capacity of 30 mL or more. Silica or porcelain materials are acceptable.

6.2 *Muffle Furnace*—An electric furnace is recommended for igniting the wood sample. A furnace fitted with an indicating pyrometer, so that the desired temperature can be maintained, is preferable.

6.3 *Analytical Balance,* sensitive to 0.1 mg.

7. Procedure

7.1 Obtain a 2-g sample of the wood to be tested using the techniques outlined in Method E871.

7.2 Ignite the empty crucible over a burner, and cool it in a desiccator.

7.3 Determine the weight of the crucible to the nearest 0.1 mg.

7.4 Place the 2-g sample of the wood in the crucible, and determine the weight of the sample and crucible.

7.5 Place the sample in a cold muffle furnace. Turn on the muffle furnace, and *slowly* heat the furnace to a temperature of 580 to 600°C. Avoid heating above this maximum.

7.6 Remove the ash and crucible to a desiccator, cool, and weigh to the nearest 0.1 mg. Repeat the heating for 30 min periods until the weight of the ash and crucible after cooling is constant to within 0.2 mg.

8. Calculation

8.1 Calculate the percent ash in the sample as follows:

$$\text{ash in sample, } \% = \left(\left(W_2 - W_C\right)/\left(W_1 - W_C\right)\right) \times 100 \qquad (1)$$

where:

W_C = weight of the crucible,
W_1 = weight of the sample and crucible, and
W_2 = weight of the ash and crucible.

[1] This test method is under the jurisdiction of ASTM Committee E48 on Bioenergy and Industrial Chemicals from Biomass and is the direct responsibility of Subcommittee E48.05 on Biomass Conversion.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

9. Report

9.1 Report the results to two decimal places as ash content, wet basis.

9.2 Use Practice D3180 and Method E871 to convert the results to other bases.

10. Precision and Bias

10.1 The following criteria should be used for judging the acceptability of the results:

10.1.1 *Repeatability*—Duplicate results by the same laboratory should not be considered suspect unless they differ by more than 0.5 %.

10.1.2 *Reproducibility*—The results submitted by two or more laboratories should not be considered suspect unless they differ by more than 1.0 %.

11. Keywords

11.1 ash; biomass; wood fuel