



Standard Test Method for Determination of ASH Content of Particulate Wood Fuels¹

This standard is issued under the fixed designation E 1534; 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 E 1126.

1.2 The values stated in SI units shall be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety problems, 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 3180 Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases²

E 871 Method for Moisture Analysis of Particulate Wood Fuels³

E 1126 Terminology Relating to Biomass Fuels³

3. Terminology

3.1 For additional information, see Terminology E 1126.

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 E 871.

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:

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

where:

W_C = weight of the crucible,

W_1 = weight of the sample and crucible, and

W_2 = weight of the ash and crucible.

9. Report

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

9.2 Use Practice D 3180 and Method E 871 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

¹ This test method is under the jurisdiction of ASTM Committee E-48 on Biotechnology and is the direct responsibility of Subcommittee E48.05 on Biomass Conversion.

Current edition approved March 15, 1993. Published May 1993.

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

³ *Annual Book of ASTM Standards*, Vol 11.05.

more laboratories should not be considered suspect unless they differ by more than 1.0 %.

11. Keywords

11.1 ash; biomass; wood fuel

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, West Conshohocken, PA 19428.