



Designation: E1755 – 01 (Reapproved 2015)

## Standard Test Method for Ash in Biomass<sup>1</sup>

This standard is issued under the fixed designation E1755; 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 ( $\epsilon$ ) 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 mass percent of residue remaining after dry oxidation (oxidation at  $575 \pm 25^\circ\text{C}$ ), of hard and soft woods, herbaceous materials (such as switchgrass and sericea), agricultural residues (such as corn stover, wheat straw, and bagasse), wastepaper (such as office waste, boxboard, and newsprint), acid and alkaline pretreated biomass, and the solid fraction of fermentation residues. All results are reported relative to the  $105^\circ\text{C}$  oven-dried mass of the sample. For particulate wood fuels, Test Method E1534 should be used.

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:*<sup>2</sup>

E1534 Test Method for Determination of Ash Content of Particulate Wood Fuels

E1756 Test Method for Determination of Total Solids in Biomass

E1757 Practice for Preparation of Biomass for Compositional Analysis

### 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *ash*—the inorganic residue left after ignition at  $575 \pm 25^\circ\text{C}$ .

<sup>1</sup> 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.

Current edition approved June 1, 2015. Published July 2015. Originally approved in 1995. Last previous edition approved in 2007 as E1755-01(2007)07. DOI: 10.1520/E1755-01R15.

<sup>2</sup> 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.

### 4. Significance and Use

4.1 The ash content is an approximate measure of the mineral content and other inorganic matter in biomass.

4.2 The ash content is used in conjunction with other assays to determine the total composition of biomass samples.

### 5. Apparatus

5.1 *Ashing Crucibles, 50 mL*, platinum crucibles are preferred, but silica or porcelain crucibles may be used.

5.2 *Muffle Furnace*, an electric furnace is recommended for igniting the sample. The furnace should be fitted with an indicating pyrometer or thermocouple, so that the required temperature of  $575 \pm 25^\circ\text{C}$  can be maintained.

5.3 *Analytical Balance*, sensitive to 0.1 mg.

5.4 *Desiccator*, using anhydrous calcium sulfate.

5.5 *Drying Oven*, with temperature control of  $105 \pm 2^\circ\text{C}$ .

### 6. Test Specimen

6.1 Test specimens suitable for analysis by this test method are as follows:

6.1.1 Prepared biomass samples that have been prepared according to Practice E1757.

6.1.2 Biomass feedstocks, dried at  $105^\circ\text{C}$  according to Test Method E1756,

6.1.3 Pretreated biomass, dried at  $105^\circ\text{C}$  according to Test Method E1756, and

6.1.4 The solids fraction of fermentation residues, dried at  $105^\circ\text{C}$  according to Test Method E1756.

6.2 The test specimen shall consist of approximately 0.5 to 1.0 g of sample obtained in such a manner to ensure that it is representative of the entire lot of material being tested.

NOTE 1—All samples should be ground or milled to reduce the size of the large pieces to less than 1 mm in diameter. The sample is then redried at  $105^\circ\text{C}$  prior to testing. Prepared biomass can be used in place of  $105^\circ\text{C}$  dried material, but the mass of the material must be corrected for its moisture content by using Test Method E1756, prior to calculating the ash.

### 7. Procedure

7.1 Mark a pan or crucible with a unique identification using a porcelain marker, place it in the muffle furnace at  $575 \pm 25^\circ\text{C}$ . Remove the pan or crucible from the furnace, cool to room temperature in a desiccator, and weigh to the nearest 0.1