Designation: E 1755 – 95

# Standard Test Method for Ash in Biomass[1]

This standard is issued under the fixed designation E 1755; 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 mass percent of residue remaining after dry oxidation (oxidation at 575 ± 25°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°C oven-dried mass of the sample. For particulate wood fuels, Test Method E 1534 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:*

E 1534 Test Method for Determination of Ash Content of Particulate Wood Fuels[2]

E 1756 Test Method for the Determination of Total Solids in Biomass[2]

E 1757 Practice for Preparation of Biomass for Compositional Analysis[2]

## 3. Terminology

3.1 *Descriptions of Terms Specific to This Standard:*

3.1.1 *ash*—the inorganic residue left after ignition at 575± 25°C.

## 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 *Aluminum Weighing Pans or Crucibles, 50 mL*, if crucibles are used, 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 ± 25°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 ± 2°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 prepped according to Practice E 1757.

6.1.2 Biomass feedstocks, dried at 105°C according to Test Method E 1756,

6.1.3 Pretreated biomass, dried at 105°C according to Test Method E 1756, and

6.1.4 The solids fraction of fermentation residues, dried at 105°C according to Test Method E 1756.

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. For 105°C dried samples containing large particles or chunks, it is recommended that the sample 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°C prior to testing. Prepared biomass can be used in place of 105°C dried material, but the mass of the material must be corrected for its moisture content by using Test Method E 1756, 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, and bring to constant mass by igniting at 575 ± 25°C. Remove the pan or crucible from the furnace, cool to room temperature in a desiccator, and weigh to the nearest 0.1 mg. Record this mass as the tare mass, $m_{cont}$. Keep the pan or crucible in a desiccator until used.

NOTE 1—For an aluminum pan, two hours of heating at 575 ± 25°C will be sufficient to bring the pan to constant mass. With a crucible,

[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 Oct. 10, 1995. Published December 1995.

[2] *Annual Book of ASTM Standards*, Vol 11.05.