



Designation: E 1755 – 01

Standard Test Method for Ash in Biomass¹

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 $575 \pm 25^\circ\text{C}$), 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°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:*²

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

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

E 1757 Practice for Preparation of Biomass for Compositional Analysis

3. Terminology

3.1 *Descriptions of Terms Specific to This Standard:*

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

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 *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 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.

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°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 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 mg. For an aluminum pan, two hours of heating at $575 \pm 25^\circ\text{C}$ will be sufficient to bring the pan to constant mass. With a crucible, however, the following procedure is used: place the crucible in the furnace at $575 \pm 25^\circ\text{C}$ for 3 h. Remove the crucible and place in a desiccator. Allow the crucible to cool to

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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.