Designation: D 1102 – 84 (Reapproved 2001)

Modification of
Technical Association of Pulp and Paper Industry
Standard Method T 211 OM-80

Standard Test Method for Ash in Wood[1]

This standard is issued under the fixed designation D 1102; 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 percentage of residue remaining after dry oxidation (oxidation at 580 to 600°C), of wood or wood products.

1.2 *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. Significance and Use

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

3. Apparatus

3.1 *Crucibles*, with tightly fitting lids, having a capacity of 30 mL or more, shall be used. Platinum crucibles are preferred, but silica or porcelain crucibles may be used.

3.2 *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.

3.3 *Analytical Balance*, sensitive to 0.1 mg.

3.4 *Drying Oven*, with temperature controlled between 100 and 105°C.

4. Test Specimen

4.1 The test specimen shall consist of approximately 2 g of wood that has been ground to pass a No. 40 (425-µm) sieve. Care shall be taken to ensure that it is representative of the entire lot of material being tested.

5. Procedure

5.1 Ignite the empty crucible and cover over a burner or in the muffle at 600°C, cool in a desiccator, and weigh to the nearest 0.1 mg. Place the 2-g test specimen in the crucible, determine the weight of crucible plus specimen, and place in the drying oven at 100 to 105°C with the crucible cover removed. After 1 h, replace the cover on the crucible, cool in a desiccator, and weigh. Repeat the drying and weighing until the weight is constant to within 0.1 mg. During the cooling and weighing periods, keep the crucible covered to prevent absorption of moisture from the air. Record the weight (crucible plus specimen minus weight of crucible) as the weight of the oven-dry test specimen.

5.2 Place the crucible and contents, with the cover removed, in the muffle furnace and ignite until all the carbon is eliminated. Heat slowly at the start to avoid flaming and protect the crucible from strong drafts at all times to avoid mechanical loss of test specimen. The recommended temperature of final ignition is 580 to 600°C. Avoid heating above this maximum.

5.3 Remove the crucible with its contents to a desiccator, replace the cover loosely, cool, and weigh accurately. Repeat the heating for 30-min periods until the weight after cooling is constant to within 0.2 mg.

6. Calculations and Report

6.1 Calculate the percentage of ash, based on the weight of the moisture-free wood, as follows:

$$\text{Ash, \%} = (W_1/W_2) \times 100 \quad (1)$$

where:

W_1 = weight of ash, and
W_2 = weight of oven-dry sample.

6.2 Report the results to two decimal places.

7. Precision and Bias [2]

7.1 Data obtained by testing 60 wood samples in one laboratory gives a repeatability as ash content of 0.03 % and as a percentage of ash content of 6.6 %. The range of ash content was from 0.16 % to 0.84 %.

7.2 Reproducibility and comparability data are not available.

8. Keywords

8.1 ash; wood products

[1] This test method is currently under the jurisdiction of ASTM Committee D7 on Wood and is the direct responsibility of Subcommittee D07.01 on Fundamental Test Methods and Properties.

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[2] Data in this section was obtained from the Technical Association of the Pulp and Paper Industry, P.O. Box 105113, Atlanta, GA 30348.