



Standard Test Method for Determination of Moisture Content of Particulate Wood Fuels Using a Microwave Oven¹

This standard is issued under the fixed designation E 1358; 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 provides an alternative method to Method E 871, for the determination of the moisture of particulate wood fuels. Particulate wood fuels are defined in E 1126.

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. Referenced Documents

2.1 ASTM Standards:

E 871 Method for Moisture Analysis of Particulate Wood Fuels²

E 1126 Terminology Relating to Biomass Fuels²

3. Summary of Test Method

3.1 Moisture is determined by establishing the loss in mass of the sample when heated under rigidly controlled conditions of temperature, time, sample mass, and equipment specifications.³

4. Significance and Use

4.1 This test method provides a rapid determination for moisture in particulate wood fuels in several minutes. The standard method, E 871, requires a minimum of 18 h. This method is applicable to situations such as the spot-check of the moisture delivered by truck where a quick indication of the moisture of wood delivered is desirable.

5. Apparatus

5.1 *Microwave Oven*—Any standard commercial microwave oven having a power output of at least 600 W can be used.

6. Procedure

6.1 Obtain a 50 g sample of the wood to be tested using techniques outlined in Method E 871.

6.2 Determine the weight of 3 sheets of standard paper towels placed on top of each other. Record this mass as M_T (Mass of Towels).

6.3 Place the 50-g sample of the wood on top of the paper towels and determine the mass of the initial sample. Record the mass as M_{STI} (Mass of Sample and Towels Initial).

6.4 Place the sample in the microwave and heat on full power using the schedule shown in Table 1 for the type of wood fuel being tested. Remove sample and towels from oven after each heating interval, weigh, and stir. When the mass change between successive weighings is less than 0.5 g, record this mass as M_{STF} (Mass of Sample and Towels Final).

7. Calculation

7.1 Calculate the mass percent moisture in the sample as follows:

$$\text{Moisture in Sample, \%} = ((M_{STI} - M_T) - (M_{STF} - M_T)) / (M_{STI} - M_T)$$

8. Precision and Bias

8.1 The following criteria should be used for judging the acceptability of the results:

8.1.1 *Repeatability*—Duplicate results by the same laboratory should not be considered suspect unless they differ by more than 1 %.

8.1.2 *Reproducibility*—The results submitted by two or more laboratories should not be considered suspect unless they differ by more than 1.5 %.

9. Keywords

9.1 microwave oven; moisture content; particulate wood fuels

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.

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

³ Harris, Robert A., "Rapid Determination of Wood Fuel Moisture Using a Microwave Oven for Drying," *Forest Products Journal*, Vol 32, No. 10, October 1982, pp. 56–59.