



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

This standard is issued under the fixed designation E1358; 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 E871, for the determination of the moisture of particulate wood fuels. Particulate wood fuels are defined in E1126.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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

E871 Test Method for Moisture Analysis of Particulate Wood Fuels

E1126 Terminology Relating to Biomass Fuels (Withdrawn 2003)³

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.⁴

4. Significance and Use

4.1 This test method provides a rapid determination for moisture in particulate wood fuels in several minutes. The

¹ 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, 2013. Published June 2013. Originally approved in 1990. Last previous edition approved in 2006 as E1358 - 97(2006). DOI: 10.1520/E1358-97R13.

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ 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.

standard method, E871, 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 E871.

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 %.

TABLE 1 Recommended Heating Times

Pine		Hardwood		
Chips (Average Moisture Control 48 %)	Sawdust (Average Moisture Control 46 %)	Sawdust and Bark (Average Moisture Control 42 %)	Hogged (Average Moisture Control 23 %)	Hogged (Average Moisture Control 12 %)
4:00 ^A	2:00 ^A	2:00 ^A	1:00 ^A	1:00 ^A
1:00 ^A	2:00 ^A	1:00 ^A	1:00 ^A	1:00 ^A
0:30 in addition to	2:00 ^A 0:30 ^A in addition to	1:00 ^A 0:30 ^A in addition to	1:00 ^A 0:30 ^A in addition to	0:30 ^A in addition to

^A Remove from oven, weigh, and stir.

9. Keywords

9.1 microwave oven; moisture content; particulate wood fuels

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