



## Standard Test Method for Ethanol-Toluene Solubility of Wood<sup>1</sup>

This standard is issued under the fixed designation D 1107; 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 the ethanol-toluene soluble content of wood, which is a measure of the waxes, fats, resins, and oils, plus tannins and certain other ether-insoluble components.

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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in 4.1.

### 2. Significance and Use

2.1 The ethanol-toluene extract of wood consists of the soluble materials not generally considered part of the wood polymeric structure. They are primarily the waxes, fats, resins, and some gums, as well as some water-soluble substances. The amounts are influenced by seasoning and drying.

### 3. Apparatus

3.1 *Filtering Crucibles*, Alundum or fritted-glass filtering crucibles of coarse porosity.

3.2 *Extraction Apparatus*—A compact form of Soxhlet extraction apparatus, with ground-glass joints, is preferable. The apparatus shall consist of the following items:

3.2.1 *Soxhlet Extraction Flask*, having a capacity of 250 mL.

3.2.2 *Soxhlet Extraction Tube*, 45 to 50 mm in inside diameter, having a capacity to the top of the siphon of approximately 100 mL and a siphon tube approximately 55 mm in height. Extraction tubes of these dimensions siphon more rapidly than extractors with higher siphon tubes.

3.2.3 *Condenser*, of the Hopkins inner-cooled type.

### 4. Reagent

4.1 *Ethanol-Toluene Solution*—Mix 1.0 L absolute ethanol and 427 mL toluene. (**Warning**—Avoid inhalation of vapors and contact with skin.)

### 5. Test Specimen

5.1 The test specimen shall consist of 2 g of air-dried sawdust that has been ground to pass a 425-μm (40 mesh) sieve and be retained on a 250-μm (60 mesh) sieve.

### 6. Procedure

6.1 Weigh two 2-g test specimens in tared Alundum or fritted-glass crucibles. Dry one specimen in an oven for 2 h at 100 to 105°C, then place in a loosely stoppered weighing bottle, cool in a desiccator, and weigh. Continue the drying for 1-h periods until the weight is constant. Calculate the proportions of moisture-free sawdust in the air-dry specimen.

6.2 Place the other specimen in a Soxhlet extraction apparatus having a tared Soxhlet extraction flask. Set a small disk of fine-mesh screen wire in the top of the crucible to prevent loss of specimen. Extract with 150 mL of ethanol-toluene solution for 6 to 8 h, keeping the liquid boiling briskly. This should provide four to six siphonings per hour.

6.3 After evaporating the solvent from the extraction flask, dry the flask and contents in an oven for 1 h at 100 to 105°C, cool in a desiccator, and weigh. Continue the drying until there is no further loss in weight.

### 7. Calculation and Report

7.1 Report the results as weight percentage of ethanol-toluene soluble matter in the moisture-free wood, calculated as follows:

$$\text{Ethanol-toluene soluble matter, \%} = (W_2/W_1P) \times 100 \quad (1)$$

where:

$W_2$  = weight of dried extract, 6.3,

$W_1$  = weight of test specimen used in 6.2, and

$P$  = proportion of moisture-free wood in the air-dry specimen (7.1).

7.2 The results shall be based on the average of at least two determinations.

### 8. Precision and Bias <sup>2</sup>

8.1 Data obtained in a round robin test involving five laboratories indicate a repeatability of 11 % and a reproducibility of 20 %.

<sup>1</sup> This test method is 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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<sup>2</sup> Data for this section obtained by the Technical Association of the Pulp and Paper Industry, P.O. Box 105113, Atlanta, GA 30348.