



Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood- Based Products¹

This standard is issued under the fixed designation D 3201; 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 prescribes the procedure for determining the moisture content of fire-retardant-treated wood and wood-based product samples after exposure to a standard high relative humidity condition of $90 \pm 3\%$ at $27 \pm 2^\circ\text{C}$ ($80 \pm 4^\circ\text{F}$).

1.2 The text of this test method references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this test method.

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. Significance and Use

2.1 The hygroscopic properties of wood and wood-based products treated with fire-retardant chemicals are often greater than for untreated products. This is particularly true at the higher relative humidity conditions. This higher hygroscopicity may cause staining, decay, poor paint adhesion, and migration and exuding of chemicals and moisture at the high humidities. Corrosion of metal fasteners may also occur.

2.2 The results obtained with this standard are important in determining the treatments with the lesser hygroscopic properties.

2.3 The results will be useful in determining exposure limitations in service for specific treated products.

2.4 Also, current leach-resistant, exterior-type, fire-retardant-treated wood and wood-based products have hygroscopic properties at this exposure nearly equal to untreated products. Therefore, the results from this standard may be useful in determining if exterior or interior type treatments have been used.

3. Apparatus

3.1 *Conditioning Room* or chamber with air circulation and controlling instruments capable of being maintained at $27 \pm 2^\circ\text{C}$ ($80 \pm 4^\circ\text{F}$) and a relative humidity of $90 \pm 3\%$.

NOTE 1—Other suitable means of maintaining these conditions are also acceptable; for example, the use of saturated disodium phosphate (Na_2HPO_4) or a barium chloride (BaCl_2) solution in a closed container with suitable solution agitation and air circulation at $27 \pm 2^\circ\text{C}$ ($80 \pm 4^\circ\text{F}$) has been found satisfactory. It is desirable to install an air pump in the air space of the container and bubble air from this space through the saturated solution.

3.2 *Oven*, air-circulated and vented, capable of maintaining a temperature of $103 \pm 2^\circ\text{C}$ ($217 \pm 4^\circ\text{F}$).

3.3 *Weighing Scale*—A scale or balance that will weigh a specimen within an accuracy of $\pm 0.2\%$.

NOTE 2—A torsion balance, Harvard trip balance, triple-beam balance, and automatic direct-reading balances are examples of suitable equipment.

4. Test Specimens

4.1 Specimens vary widely depending on the type of material being analyzed. Specimens shall be selected that represent the lot. Unless otherwise specified, specimens shall be full cross sections, no less than 25.4 mm (1 in.) along the grain, but longer as needed to provide a minimum volume of 33 cm^3 (2 in.³).

4.2 The specimens shall be penetrated by the chemical to be representative for the treated product.

4.3 The specimens shall be in moisture equilibrium with a laboratory ambient condition of 30 to 65 % relative humidity or shall be exposed for at least 7 days at such a condition prior to high-humidity exposure.

NOTE 3—If it is likely that the specimen will support fungal or mold growth during the high humidity exposure, then the specimens should be sprayed with a suitable biocide just prior to the above exposure and allowed to air-dry for the seven days.

4.4 Untreated specimens, when available, of the same species or wood-based product and of the same size, shall be exposed to the preconditioning, high-humidity exposure, and drying along with the treated specimens.

¹ This test method is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.07 on Fire Performance of Wood.

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